SEP 29 1925

Medical Lib.

THE JOURNAL OF RADIOLOGY

Vol. VI SEPTEMBER, 1925 No. 9

PUBLISHED MONTHLY

AT OMAHA, NEBRASKA

OFFICIAL PUBLICATION THE AMERICAN COLLEGE OF RADIOLOGY AND PHYSIOTHERAPY

The JOURNAL OF RADIOLOGY
Omaha, Nebraska

Vol. VI. SEPTEMBER, 1925 No. 9

International Association of University Lecturers of Radiology

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Vienna, Austria.

THE organization of the International Association of University Lecturers of Radiology, founded March 28, 1924, arose out of the feeling of many roentgenologists that the proper relationship did not exist between the importance of the science of roentgenology and the provisions for the teaching of this important subject. Furthermore, the evidence at hand at present indicates that because of the many antagonistic viewpoints, the instructors of roentgenology themselves are in need of a medium of exchange for their personal experiences and conclusions.

It appeared to the first small group that, besides the supplementary training, as it were, of the physician, a systematic instruction must be fastened in the mind of the student, and for this purpose two methods must be developed: (1) By means of the general physical, technical and medical principles of the science of roentgenology (general roentgenology), (2) A continuation of the instruction in the clinics (applied or special roentgenology). For comparison, attention is directed to general histology and clinical microscopy, or to general medical chemistry and the clinical methods are interwoven with the remaining clinical problems. Special roentgenological instruction, combined with clinical teaching, has developed everywhere automatically; but it manifests itself as inadequate because of a lack of presentation of the general principles. Students and teachers alike are aware of the corresponding lack of fundamentals in college instruction and bestir themselves in vain to compensate for the need. In contrast the advantage—yes, the necessity—of combining the cases of the clinic with the other methods of special roentgenology is indubitable. These were the fundamental viewpoints of the majority of members at the time of the founding of the *Association*. The purpose of the *Association* is to develop the preceding and to supply that which is lacking.

Further problems arise besides the individual ones that cause small difficulties with reference to the clinical special roentgenology, greater difficulties with reference to general roentgenology. Their solution is only indicated, the means—teaching plan, arrangement of nomenclature, incitation of the teachers of physics, personal contact to adapt their instruction, textbooks, teaching aids such as demonstration models, plates, tables, assortment of pictures and picture productions—all are up for discussion. The systematic communications of suggestions in the circle of members and associates is at the disposal of the *Association* as a means of solving the teaching question. This would consist of the reception, combination and distribution of the suggestions. The communications have consisted principally of the experiences of difficulties and challenging instances[1], additional teaching plans, separate scientific articles[2], duplications of teaching aids, etc.[3] Also to be considered are the organization of conventions, reciprocal visits and facilitated group journeys, etc. An additional method is the attraction of learned and other personalities who are in sympathy with association purposes, as advisory and honorary members and patrons.

After completing the business of the constitution, the *Association* began to turn to its recognized teachers of roentgenology by means of circular letters and questionnaires drawn up in four languages, whether in the main sub-

*The first official publication of the International Association of University Lectures of Radiology, received May 3, 1925.

ject or an allied subject. These articles, because of local differences more refractory than one would believe, are still incomplete. But the *Association* now has the opportunity to state, with sufficient evidence to substantiate, as the accompanying membership list indicates, that *it has now become a world wide organization.* The majority of those who have worked for the existence of the *Association* has completed the present accessions and the directing committee was able to find much spirited acquiescence in the answers and reports.

MEMBERSHIP ROSTER

The subject of the "Venia Legendi," with respective location of teaching commission and addresses, is alphabetically arranged.

The regular members—professors and instructors of roentgenology alone as well as of a medical specialty and roentgenology—to date include:

Altschul, Walter, M. D. Instructor of roentgenology Prague (Czechoslovakia) Vladislavova 17.

Attilj, Sordello, M. D. Instructor of medical radiology and electrotherapy Rome (Italy), 16 via Alpi.

Bertolotti, Mario, M. D. Professor of radiology Turin (Italy), 3 via Galleori.

Budinoff, Dimitrius, M. D. Lecturer of roentgenology, Moscow (Russia), Pokrowka B. Uspenskij p. 12.

Burchard, Albrecht, M. D. Professor of medical roentgenology Rostock (Germany), Augustenstrasse 122.

Case, James Thomas, M. D. Professor of roentgenology Battle Creek, Mich. (U. S.), Battle Creek Sanitarium.

Ceresole, Giulio, M. D. Instructor of radiology and electrotherapy. Venedig (Italy), 6039 Santo Marina.

Chaoul, Henri, M. D. Instructor of active science Munich (Germany), 2 Surgical clinic.

David, Oskar, M. D. Instructor of internal medicine and radiology, Frankfurt a. M. Germany, 36 Gagern St.

Dehn, Otto, M. D. Instructor of medical roentgenology and clinical diagnosis, Leningrad (Russia), State Medical Institute.

Dillon, Jacob, M. D. Instructor of medical roentgenology, Moscow (Russia), Bjelinskistrasse 4/2.

Eisler, Fritz, M. D. Instructor of medical radiology, Vienna (Austria), VIII Alserstrasse 43.

Elischer, Julius von, M. D. Professor medical roentgenology, Debreczen (Hungary), Central Roentgenological Institute of the University.

Forssell, Gosta, M. D. Professor of medical roentgenology, Stockholm (Sweden), Bergsgatan, 2.

Fritz, Otto, M. D. Instructor of medical roentgenology, Innsbruck (Austria), Krankenhaus, Central Roentgeological Institute.

Fujinami, M. D. Professor of medical roentgenology, Tokio (Japan), Utisaiwai St., 1 Kojimatiko.

Grashey, Rudolph, M. D. Professor of roentgenology and surgery, Munich (Germany), Schwabinger Krankenhaus.

Groedel, Franz, M. D. Instructor of roentgen science Bath Nauheim (Germany), Terrassen St., 2-4.

Guarini, Carlo, M. D. Instructor of radiology and electrotherapy, Neapel (Italy), 8 Piazzo della Borsa.

Haudek, Martin, M. D. Instructor of medical roentgenology, Vienna (Austria), VIII Langegasse 63.

Helm, Friedrich, M. D. Instructor of internal radiology, Reichenberg i. B. (Czechoslovakia).

Herrnheiser, Gustav, M. D. Instructor of general roentgenology, Prague (Czechoslovakia), II Hybernska 42.

Holfelder, Hans, M. D. Instructor of surgery and radiology, Frankfurt a. M. (Germany), Eschenbach St. 14.

Holmes, George Winslow, M. D., Professor of radiology, Boston, Mass. (U. S.), Massachusetts General Hospital.

Holzknecht, Guido, M. D. Professor of medical roentgenology, Vienna (Austria), I Liebiggasse 4.

Janowski, Anton, M. D. Professor of roentgenology, Leningrad (Russia), Rilief St. 17/4.

Kelen, Bela, M. D. Professor of medical radiology, Budapest (Hungary), Ulloi ut 26, University Roentgenological Institute.

Kienbock, Robert, M. D. Professor of medical roentgenology, Vienna, (Austria), VIII Schmidgasse 14, Sanatorium Furth, Roentgen Institute.

Kok, Cornelius, M. D. Instructor of radiology, Utrecht (Holland), Julianalaan 17.

Leb, Anton, M. D. Instructor of medical roentgenology Graz (Austria), Glacis St. 35.

[1]Questions from members and associates in cases of difficulty will be considered and answered by the working committee of the Association after careful evaluation of the experiences handed in by its members.

[2]Direct personal exchange on the basis of the membership list is intended.

[3]Through the executive committee, duplication of teaching aids will be facilitated.

Lenk, Robert, M. D. Instructor of medical roentgenology Vienna (Austria), IX Boltzmanngasse 22.

Le Roy, Saute, M. D. Associate Professor of roentgenology St. Louis, Mo. (U. S.), St. Louis University Medical School.

Loomis, Bell, A. L. Professor of radiology Brooklyn, N. Y. (U. S.), Long Island College Hospital.

Ludin, Max, M. D. Instructor of general roentgenology and physical therapy, Basle (Switzerland), Leimer St. 28.

Maragliano, Vittorio, Jr., M. D. Professor of electrotherapy and radiology Genoa (Italy), 39/6 Via Galata.

Mayer, Karol, M. D. Professor of radiology (application in internal medicine), Posen (Poland), Skarbowa St. 2.

Mezernitzki, Polien, M. D. Professor of general therapy and physiotherapy, including x ray and radium, Baku (Russia) University.

Milani, Eugenio, M. D. Professor of radiology and electrotherapy, Rome (Italy), 25 Via Castelfidaro.

Negru, Dimitrie, M. D. Professor of medical radiology, Cluj (Roumania), Strada Minerva 13.

Nemenoff, Michael, M. D. Professor of roentgenology, Leningrad (Russia), Roentgent St. 6.

O'Brien, Frederick William, M. D. Assistant professor of roentgenology Boston, Mass. (U. S.), 465 Beacon St.

Perussia, Felice, M. D. Professor of medical radiology, Mailand (Italy), 28 Via Bergamo.

Pfahler, George Edward, M. D. Professor of roentgenology, Philadelphia, Pa. (U. S.), Spruce St., 1321.

Ponzio, Mario, M. D. Instructor of radiology and electrotherapy Turin (Italy), Ospedale Mauriziano.

Popovic, Laza, M. D. Professor of roentgenology Zagreb (Jugoslavia), Trinjevac 17.

Regaud, Claudius, M. D. Professor and director of the Radiophysiological University Institute, Paris (France), V., Pasteur Laboratory, 1 Rue Pierre Curie.

Rose, Cassie Belle, M. D. Assistant professor of roentgenology, Chicago, Ill. (U. S.), Presbyterian Hospital.

Rosselet, Alfred, M. D. Instructor of medical roentgenology, Lausanne (Switzerland), Kantonspital.

Rossi, Armando, M. D. Instructor of radiology and electrotherapy, Parma (Italy), 48 Via Ninio Pixio.

Schwarz, Gottwald, M. D. Professor of medical roentgenology, Vienna (Austria), IX Liechtenstein St. 45.

Schinz, Hans Rudolph, M. D. Instructor of roentgenology and radiology, Zurich (Switzerland), Krantgarten Gasse 2.

Selaheddin, Mehmed Sahli, M. D. Professor of medical roentgenology, Constantinople (Turkey), Kalamisch 41.

Sgalitzer, Max, M. D. Instructor of medical radiology, Vienna (Austria), VIII Albertgasse 39.

Sgobbo, Francisco Paolo, M. D. Professor of medical radiology and electrotherapy, Neapel (Italy), 216 Via Chiaia.

Siciliano, Luigi, M. D. Professor of radiology and electrotherapy, Florence (Italy), 41 Via Guerazzi.

Staunig, Konrad, M. D. Professor of medical roentgenology, Innsbruck (Austria), Allgemeines Krankenhaus University—Institute for Roentgenology.

Stewart, Wm. H., M. D. Clinical professor of roentgenology, New York City (U. S.), 222 West 79th St.

Tyler, Albert Franklin, M. D. Professor of roentgenology and physiotherapy, Creighton Medical College, Omaha, Neb. (U. S.)

Voorhoeve, Nikol, M. D. Instructor of roentgenology, Amsterdam (Holland), Vossins St. 28.

Weber, Eugen, M. D. Professor of medical roentgenology, Vienna (Austria), III Apostelgasse 12.

Zeitlin, Alexander, M. D. Instructor of roentgenology, Moscow (Russia), Kusnetzky most 15.

The complete list of the members and coworkers will appear later.

The statistical compilation of the material contained in the questionnaire answers gave the following provisional but interesting result: The number of regular members up to the middle of April, 1925, were 60. Other names are in the hands of the working committee, amongst them such as have been nominated as advisory members by the executive committee.

From the sum total of the questionnaire answers, it is learned that 54 members are engaged in general roentgenology, including the entire field.

In special roentgenology, 6 are found.

ACADEMIC RANK OF MEMBERS

Regular professors of Medical Roentgenology	10
Regular professors of Medical Roentgenology and Electrotherapy, including Physiotherapy	6
Extraordinary professors of Medical Roentgenology	12
Extraordinary professors of Medical Roentgenology and Clinical Medicine or Surgery	3
Instructor of Medical Roentgenology	17
Instructor of Medical Roentgenology and Clinical Medicine or Surgery, etc.	2
Instructor of Roentgenology and Radiology	3
Instructor of Medical Roentgenology and Electrotherapy (or perhaps Physiotherapy)	6
Lecturer	1

In looking ahead at the necessary student instruction in the general field of roentgenology (and without reference to the no less important but already all inclusive special roentgenology of the individual clinical specialties), the question was included in our questionnaire concerning the separation or combining of the roentgenophysical and medicoroentgenological phases. The answers are as follows:

In favor of combining the instruction in physical and medical roentgenology	52
In favor of separate instruction in the physical phase and roentgenological	12
Question unanswered	11

The students desire instruction in medical roentgenology, according to answers received from 53 places; the answer was in the negative in nine instances; in the remaining cases the question was unanswered. In general, lectures with demonstrations are presented to the students, with emphasis on the practical side of the theoretical lectures.

Instruction and examination in medical roentgenology is compulsory in certain places in the following countries: America, Italy, Roumania, Russia, Sweden and Spain.

Only six or seven of the 49 authorized teaching commissions arose in the pre-war period. All others were authorized during or since the war.

The material contained in the received questionnaires and the scanty literary productions do not make it possible as yet to give an exact picture of the state of instruction under special teachers of roentgenology, in the different countries. For this reason, we are content to submit returns from certain countries, concerning which we are measurably informed.

A high index figure (III in table) is indicated by Italy and the United States, but we are not in possession of all of the information. Concerning the other countries the report will appear later. We are attempting here to impart the more important communications that may later need revision.

From these statistical facts it is evident that the question of roentgenological instruction in general and especially the problem of student instruction in the last post-war years has made big strides in its development and that the conviction of its necessity is visibly spreading in the academic and governmental circles. The ideas concerning the mode of organization still lack much in stability and unanimity.

The number of young forces with which the "Venia Legendi" of medical roentgenology, with its changeable formulae of teaching titles, will be allied with, has shown a rapid growth in the past year. Also the idea of obligatory instruction has taken deep root. In Europe, for example, the countries without obligatory instruction are almost surrounded by a circle of countries with obligatory instruction. A graphic representation will be contained in one of the next circular letters.

The final solution of the problem is a ques-

	I	II	III	IV	
Country	No. of College teachers exclusively for (pure) Medical Roentgenology	No. of Medical faculties or Medical Prep. Colleges	Ratio of these numbers	Instruction	
				Obligatory	Nonobligatory
Germany	5	23	0.2 (5:23)	..	1
Czechoslovakia	4	3	1.3 (4:3)	..	1
Jugoslavia	1	2	0.5 (1:2)	..	1
Austria	12	3	4.0 (12:3)	..	1
Roumania	1	3	0.3 (1:3)	1	..
Russia	12	12	1.0 (12:12)	1	..
Hungary	2	4	0.5 (2:4)	..	1
Switzerland	2	3	0.7 (2:3)	..	1

tion of an evidently not too distant future and it is a question of fresh recruits from youth. These must be called forth and many must be summoned in order that good forces may be placed at the head. Only then will the organization completely serve its purpose. Individuals cannot create lasting institutions. Therefore, the development of roentgenological instruction in the colleges needs the constant attention of those to whom the future belongs. By virtue of their knowledge of local peculiarities and their close connection with the "sometimes" studying generation and their position in practical departmental work, they can contribute many singular and regular experiences and suggestions that are not so easily available to teachers. And, finally, it is quite an accesion to the cause if those of the coworkers who perhaps at some time devote themselves to college instruction in roentgenology, may early come to know the road they in a general way are traversing and the methods of those who are serving elsewhere. In the older departments this knowledge is accessible and universally distributed. In the new ones its spread requires an organization.

REQUIREMENTS FOR ADMISSION AS ASSOCIATE MEMBERS

The requirements for admission as associate members call first for a recommendation by a member. The second requisite necessitates scientific accomplishments and the third must be accommodated by a place of practical work.

Associate members are not permitted to vote, but do have a share in the experiences received for distribution in the reports concerning the ways and means of furthering the common purpose; and also in removing the obstacles to the same. The association elects as associate members at its own proposal such roentgenologists as have been active in the specialty in a rather large place of work, actively and scientifically effective, and can show evidence of a recommendation from a regular or advisory member of the association.

Correspondence may be conducted in any world language.

BY-LAWS

From the By-Laws: President and Vice President change every two years. The working committee is composed of permanent and alternating members and at present its location is in Vienna. The enlarged directing committee will be chosen from the members of all countries.

A number of administrative transactions will be turned over directly to the members and associates. These contain amongst others: Motions to elect according to the By-Laws representatives of each country on the directing committee and to rotate the presidency of the *Association* by countries. In this manner the complete metamorphosis of the *Association* into an important world organization will be aided. Furthermore, an exposition concerning the future of roentgenology such as a further compilation of the reports received from the gentlemen of different countries and as presented by Professor Holzknecht in the sessions of the executive committee is included. Finally, motions to elect certain outstanding men as honorary members, advisory members or patrons is warranted.

Every college teacher of roentgenology who has not received our invitation heretofore, or who is not now a member, we hereby duly invite to become members. By means of this open circular letter, which will also appear in departmental journals of all countries, the *Association* hopes with the knowledge of the present state of roentgenological instruction in the different countries, to be of some use.

The secretary's office of the ASSOCIATION OF COLLEGE TEACHERS OF MEDICAL ROENTGENOLOGY is located in Vienna, VIII, Langegasse 63.

(Signed) The First Directing Committee: Haudek, Holzknecht, Kienbock, Weber.

(Translated from the original German by Walter Herrmann.)

Diseases Originating at the Gum Margin*

WILLIAM L. SHEARER, D. D. S., M. D., F. A. C. S., and
ALBERT F. TYLER, B. Sc., M. D., F. A. C. P.,
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CERTAIN diseases of the teeth begin at the gum margin and slowly extend down beside the tooth and even around the apex. Few adults of middle age, or older, are free from this type of oral pathology. Where the pus pockets are deep or where many teeth are involved, not only severe local symptoms may occur, but great systemic disturbances may result. A single pus pocket may become closed over and result in pus under pressure entering the Haversion canals of the cancellous bone of the alveolar process and pass thence into the general circulation. In a general involvement of all teeth, the diseased surface of bone is very large and gives abundant opportunity for absorption.

ETIOLOGY

1. Mechanical: (a) Trauma. The patient may injure the gum margin by the use of a toothpick or the bristle of a tooth brush may become lodged between the gum margin and the tooth.

(b) Bad occlusion. In other cases bad occlusion may be present which results in food being forced in between adjoining teeth. This food decomposes and furnishes a rendezvous for myriads of bacteria, which invade the gum margin and slowly destroy the periodontal membrane and the alveolar bone.

(c) Ligature and rubber dam. Occasionally following some dental operation a small piece of ligature or rubber dam may be left between the teeth. This acts as a source of irritation to the gum margin and may produce a pus pocket.

(d) Overhanging fillings. Decay frequently occurs in the tooth in a location which is difficult of approach, as low down on the side of the crown proximal to an adjoining tooth. The filling frequently overhangs the seat made for it. In every instance this results in recession of the alveolar margin underneath.

(e) Overhanging or poorly fitted crowns. may come through the gum only at one side because of impaction against a second molar or in the ramus of the mandible. The jaw does not adhere to the enamel of the crown, consequently food and liquids taken into the mouth When crowns project away from the tooth the cement soon becomes washed away and the space thus left harbors bacteria, which sooner or later cause absorption of the alveolar margin beneath.

2. Impacted teeth: The lower third molars are the most frequent offenders. The crown easily find their way into the pocket thus formed. Bacteria then soon destroy the alveolar process, making a pus pocket.

Less frequently an upper third molar will give rise to a marginal abscess in the same way.

We have seen extensive destruction of the

*Received for publication

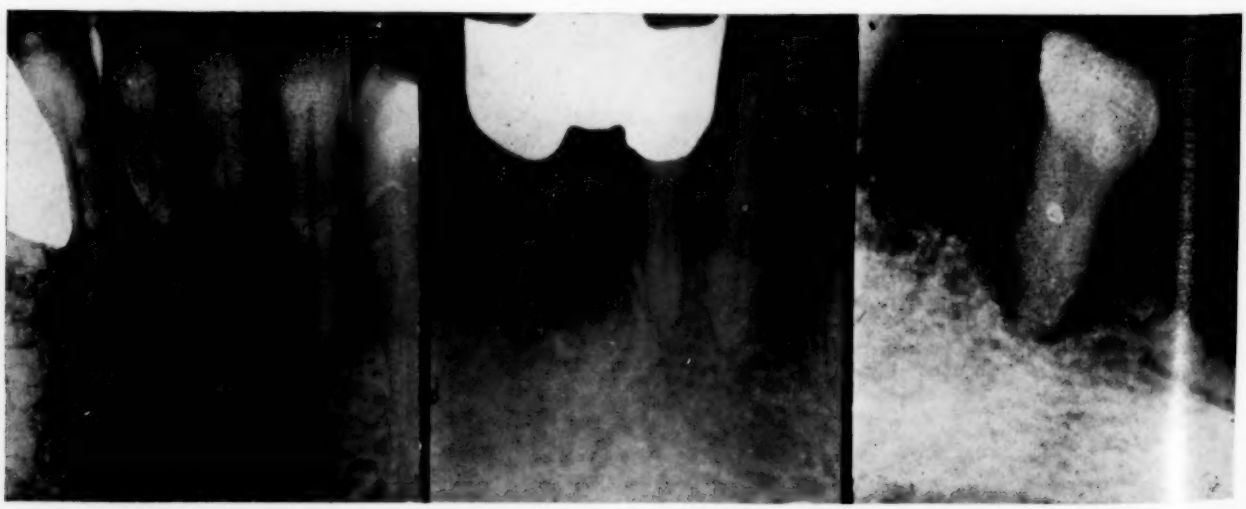

Fig. 1—Calcareous deposit is on sides of teeth near gum margin, accompanied by absorption of the alveolar margin. Most frequent in the lower incisor region.

Fig. 2—Destruction of the alveolar margin almost to apices of teeth.

Fig. 3—Pyorrhea pocket extending around apex of tooth.

alveolar process around a partially erupted, impacted or misplaced upper cuspid.

In other cases where the misplaced tooth is in such a position that it does not come through the gum, absorption of the process or of the tooth against which it presses occurs and in some instances subsequent infection takes place.

3. Pyorrhea alveolaris: This disease is well nigh universal in those past middle life. The chief cause is the endameba buccalis, but staphlococci and streptococci are always present at the same time.

As a general rule, many of the teeth are affected, the lower ones to a greater extent than those in the upper jaw. This is explained by some as due to the fact that the pockets along the sides of the upper teeth have the open portion downward, thus draining much better than those in the lower jaw, where the opposite condition exists.

4. Vincent's angina: In some patients the gums recede from the teeth, forming pockets along their sides, together with a destruction of the alveolar margin. This condition may appear in the young. Microscopic examination shows the presence of Vincent's fusiform spirillum. The disease may affect one or all the teeth. Careful and thorough treatment is needed to stop the process and extraction is to be avoided in this condition.

SYMPTOMS AND PHYSICAL FINDINGS

Patients affected by disease originating at the gum margin may notice that the gums bleed easily during brushing, or the affected teeth may become sensitive to pressure during mastication. In other cases where drainage is inadequate, severe toothache calls the attention of the patient to the trouble.

On inspection the gum margin will appear inflamed and separated from its usual close attachment to the tooth, with pus exuding from the opening.

The tooth may be quite loose in the socket and when moved or tapped pain results. The dental instrument can be passed well down along the side of the tooth between it and the side of the gum. Calcareous deposits may be felt on the side of the tooth or may be seen near the gum margin.

Microscopical examination of the pus will enable one to detect the etiological organism.

The roentgenogram visualizes the amount of bone destruction in the mesial and distal surfaces, but gives an inadequate idea of the destruction on the buccal, labial or lingual surfaces. It is of great value in determining the destruction between the roots of multirooted teeth, as well as detecting the presence of overhanging fillings and crowns.

TREATMENT

Early in the disease, mechanical scraping is used to rid the teeth of all calcareous deposits, followed by topical applications of various medical substances in common use, which, coupled with rigid care of the teeth by the patient, results in great benefit. Persons suffering from marginal disease should consult their dentist regularly every three months. When the disease has advanced so far that the teeth must be sacrificed, they should not only be extracted, but every bit of diseased alveolar process should be removed at the same time. This can be done under nerve block anesthesia, and when the disease is all removed the mucoperiosteal flaps can be sutured with horsehair and will heal by primary union.

Modifications Which Have Been Wrought on the Treatment of Pulmonary Tuberculosis During the Last Twenty-five Years*

J. D. GIBSON, M. D.,
Denver, Colo.

THE treatment of Pulmonary Tuberculosis has interested the medical man from time immemorial. Hippocrates' dictum, "Buy a cow, drive the cow to the mountains and live on the cow," has been a synonym for "Rest and Diet" for ages.

With the discovery of the tubercle bacilli by Koch the first great advance in our knowledge of tuberculosis was made, giving a specific cause of the infection, a definite truth from which to work. His discovery and claims for tuberculosis were hailed all over the world with great joy and hope, but in itself was a bitter disappointment, yet it was another step in tubercle therapeutics.

In the latter part of the last century Trudeau of New York, Bonney, Dennison, Sewall and many others of their confreres in Denver, Colorado, succeeded in building on a firm foundation the well known diet, rest, fresh air and sunshine method of treatment, which is the present foundation of all methods of treatments for pulmonary tuberculosis; and, without a firm stand upon this foundation, no treatment so far known is of much benefit. Therefore, in this discussion every suggestion must be regarded as added to or builded on the above foundation.

The next important advancement made was reported by J. B. Murphy of Chicago at the Denver meeting of the American Medical Association. He suggested the idea of compression in one-sided tuberculosis by means of gas, or in more technical terms, artificial pneumothorax. This did not meet with popular approval at once, but by slow, steady steps it has gradually grown in favor and this writer predicts that its usefulness has scarcely begun compared with its ultimate value.

Remember the first step in the treatment of any tuberculous condition is to obtain rest. When we are able to collapse a lung we produce or give it a perfect physiological rest, placing it in the best possible condition for healing. It also can be used for the control of pulmonary hemorrhage and, with the rest thus given the lungs, there is obtained a great amelioration of the incessant cough and toxemia which frequently transforms a bed patient into an ambulant one. When the artificial pneumothorax is contra-indicated from any cause the same result may be obtained by an external thoracotomy or a resection and removal of a portion of all of the ribs of the affected side of the chest, which allows a collapse of the chest wall down upon the lung, compressing it in a very effective manner, giving good results in many cases.

While doing some postgraduate work in New York City in 1898, the late lamented Cleaves brought to my attention her method of treating pulmonary tuberculosis with light. She had a cabinet in which were two very powerful arc lights, which were brought to bear upon the entire body of the nude patient. She maintained that perspiring eliminated the poison from the blood and the actinic rays from the powerful arcs had a beneficial effect upon the general well-being of the patient, tanning the skin like sunshine, aiding the cough and expectoration in a very definite way.

At the meeting of the American Therapeutic Association in Washington in 1899, Dr. J. H. Kellogg of Battle Creek read his memorable paper on *Light*. He had just returned from Copenhagen, where he had watched the beginning work of Finsen, experimenting with actinic rays upon lupus. Dr. Kellogg was very enthusiastic on the subject at that time, and many of you will remember that in those days, as well as at the present, Battle Creek Sanitorium was the fountain head of knowledge of all light therapy. The arc lights were clumsy and the heat very objectionable. Then, too, I found it extremely difficult to heat ambulant patients with these arc lights and send them out on the street without danger of their taking cold, even though given showers and rubbed down. But I thought when these precautions were taken and the patient was put to bed that good results were obtained.

In the latter part of 1900 the Biological Manufacturing Companies brought out various serums to fight various infections in the blood or special infection, mixed infection, etc., as antipneumococcic serum and antistreptococcic serums. In discussing the matter with Dr. S.

*Read at the Third Annual Meeting of the American College of Radiology and Physiotherapy, Chicago, Nov. 13, 1924.

G. Bonney, I found that he had had some good results with the serum for mixed infection in tuberculosis, consequently I began using it in my serious cases with mixed infection, and I think they are of great advantage in properly selected cases. I am confident that they have helped me save the lives of many patients, but never by hypodermic use. Every patient, I believe without exception, with whom I used antistreptococcic serum hypodermically, or intravenously, died on me sooner or later, so I adopted the method of using a rubber tube and injecting the ten cubic centimeters into the rectum before going to sleep for the night. By this means my patients had no shocks, collapses, nervous chills and swollen joints. Invariably, they were much improved, cough relieved and temperature lessened or disappeared altogether. So you see why I prefer to use it by the rectum. I consider that in desperate cases, running temperature 103 or 104 degrees at night, with sweats and chills, it is indeed of supreme value. These serums are found, incidentally, to be beneficial in managing pulmonary hemorrhage and led to the old-time preparation of a simple or plain horse serum for special use in pulmonary hemorrhage, which have been greatly improved in the last few years until now every biological manufacturing company has its excellent and effectual biological products for the arrest of hemorrhage, as most of you recall. From the old arc lights of Cleaves and Finsen there have been developed on a magnificent scale the actinic lamps, until there now are Hewet mercury arc lamps, which have been perfected by the use of quartz instead of glass and made both water and air cooled, which give them a wide range of therapeutic efficiency.

There is no question but that they can be used advantageously in properly selected cases of tuberculosis, both local and constitutional, but they have the handicap of very little penetration and their effects upon the deeper tissues must be blood and lymph-borne. It is true this means the depositing of lime and other mineral salts, which are of undoubted value in the arrest of pulmonary infection, but they have little effect directly upon the very active tissues or the encapsuled areas, as no blood or lymph-borne agents can reach encapsuled tubercle bacilli. This is the real cause of the little benefit of all, or nearly all, internal medication as far as pulmonary tuberculosis is concerned.

About 1903 Strong of Boston became quite enthusiastic over the use of high frequency electricity, known now and generally spoken of as diathermia, in the treatment of pulmonary tuberculosis. Strong soon found he had so much trouble with reactions, hemorrhage and sepsis that he abandoned it. Then Geyser of New York took it up about 1910 and wrote a great deal on the subject, but confined his work to early cases and advised against its use in desperate or so-called hopeless cases. Diathermy is, of course, a modality that has a wide range in production. For instance, its great usefulness comes from its heat and sedation, which is increased or regulated by the volume and potential of electric current used.

The late high frequency machines are capable of furnishing from zero up to 5,000 milliamperes, which will roast meat or cook potatoes, so you can judge of the amount of heat obtainable. This current can, I think, be used to advantage in judiciously selected cases of pulmonary tuberculosis. I use it and have used it for years, but do not remember it ever having played an important part in the recovery of any tuberculous patient.

Since the World War the use of all physical therapeutic agents have been perfected and have become so popular with the profession that it is difficult for most physicians to classify their many modalities to their varying needs.

The x ray, *The Ultima-Thule* of all light or the finer or shorter vibrations of the ether or electrons, has a wider range of usefulness than probably any other therapeutic agent known. It is perhaps the only agent in the treatment of pulmonary tuberculosis whose effects are primary and direct upon the seat of the lesions, whether they are local or diffuse. The very hardening or density of fibrosing tubercle areas adds to the intensity of the x ray effects upon them. The interchange of electrons at the terminals of secondary rays and direct terminal beams takes place in greater abundance than in the smooth, normal lung tissue.

No other light ray nor electric current, with the exception of radium, has this effect upon these tissues. We must remember that x rays have a wide range of production, say from a slight fluorescence of screen to rays that will penetrate substances almost inconceivable, owing to the vacuum of the tube used and the electric potential and amperage of current used in their production. In using the rays, the operator must of necessity be well acquainted with the ray that he is using and be able to change the ray to suit the different pathological conditions in hand.

The effects of x ray in treating pulmonary or other forms of tubercle infection are so definite and specific that, when the physician becomes familiar by experience with its results, he can predict weeks or even months ahead as to the condition of the patient at the time and give definite prognoses with great certainty as to when the patient will be able to return to his former occupation. Of course, there will be exceptions in some few cases, but by experience, careful diagnosis and evaluation of the various complications of each individual case, the time of recovery can be well prognosticated. X rays have a very marked effect upon all tissues through its varied degrees of stimulating effect. It is capable not only of mild and gentle stimulation, but this stimulation can be carried further, producing a perversion of tissue, effects as we see in telangiectasis and still further a keloid condition, and it finally, by gross overstimulation or destructive stimulation, we have burns with absolute destruction of tissues. So in treating pulmonary tuberculosis we desire only the first grade of stimulation, but want it mild like sunshine with sun tanning effects down in the lung on the spots or masses of infection. Here where it is needed, we can put in this sun tanning, sunshine effect so definitely that we and the patient can see its beneficial effects almost at once. This dosage not only invigorates the normal and the pathological cells, but you must remember at the same time they inhibit the propagation of the bacilli, lowering their vitality and interfering with their food supply. With all normal physiologic stimulation, we have an increased blood supply to the stimulated tissues and I have shown previously that with this increased blood supply we have an enormous increase of the large mononuclear leukocytes or phagocytic white blood cells that have the especial power of engulfing, digesting and destroying the wax-coated tubercle bacilli. So with x ray stimulation to these diseased areas of the lung we bring an increase of the blood supply where it is needed, and this blood is especially rich in opsonin and the very phagocytes nature has prepared for the especial destruction of the bacilli; so we are bound to have a victory for the normal cells, with defeat for the bacilli and recovery for the patient.

Nothing could be worse or more dangerous for the patient than a massive dose of x rays on a tuberculous lung. This has frequently been demonstrated by massive dose radiation over lung areas in treating malignant conditions. The author has been calling attention to this danger for twenty years, impressing upon the minds of his hearers that pulmonary tuberculosis must not be treated with large or massive doses of x rays as are used in the handling of malignancy; the effect must never be allowed to reach near the point of destruction or injury of lung tissue.

A. N. Davis, M. D., of Rochester, Minn., has just published in *Radiology* a splendid paper demonstrating the dangers of massive doses of x rays on lung tissues. The stimulating dosage as used by the author is as follows: For patients with a moderate amount of infection and not specially active, weighing about 125 pounds or less, give

$$\frac{2 \text{ to } 3 \text{ ma} \times 9 \times 10}{12}$$

When the patient weighs 125 pounds or more, give

$$\frac{3 \text{ to } 4 \text{ ma} \times 9 \times 10}{15}$$

Use a filter of 2 mm. aluminum as a regular procedure. X rays are given three times weekly, or every other day, and the application is made alternating over front and back of chest. The author as a regular procedure gives the "static brush discharge" over the cervical and dorsal spine on alternate days with x rays. This is used not only as a tonic for their splendid effects of metabolism, but it acts as an excellent means for the removal of the debris effects of the x rays, thus preventing toxemia and lending a powerful synergistic effect to the treatments. I would call attention now also to the daily inhalations by the patients of an Ozonized Oil Nebula for its cleansing and soothing effect on the bronchial tree, lessening the cough and adding to the pleasure and benefit of patient. In some cases the actinic rays and diathermia may be used to advantage in changes occasionally with the electricity. Do not lose sight of the fact that x ray is the chief factor in the permanent and complete relief or cure of the tuberculosis, and the above formula will put the sunlight, sun tanning effect down into the lung tissues where they are needed and will do the most good.

The idea is to put down into the diseased tissues the same tanning effect you get on the skin from the sun in heliotheray, sunlamps or x rays in a physiological stimulating dose. The fluoroscope can also be used as an aid to obtain the desired effective dose. In a dark room, after the eyes become accustomed to the

darkness, have your rays penetrating enough to show through fluoroscope, but not enough for regular examination and just enough to be seen that they are coming through. The effective rays are the ones that are absorbed and lost in the tissue mostly as spangled secondary rays, etc., thus giving us not only the illuminating effect of the primary, as proven by the fluoroscope, but we also have the electrical effect just when we need it in the exchange of the ions and electrons in the diseased areas producing the stimulation, which is the whole "gist" of this discussion. With the above method of treatment, which the author has used for many years in the handling of thousands of patients, he believes that if carried out in a systematic manner the lung tissue can be sterilized, not only of tubercle bacilli, but of every other complicating microbial infection, and in doing so the immunity of the blood tissues and host will be so much increased that relapse and exacerbations will be almost an impossibility.

The sterilization can be made so effective that patients can return to their former homes and occupations and enjoy their lives to the fullest, the men being able to support their families and the women to take care of their home, go through pregnancies, raise their children and never die of tuberculosis.

CONCLUSION

First—All treatments of pulmonary tuberculosis must be an addition or added to the foundation basis of rest, diet, sunlight and fresh air.

Second—Compression of the lung can be added as the most effective agent in the treatment of many dangerous cases of tuberculosis.

Third—The antistreptococcic serums can be used to great advantage in tuberculous cases complicated with mixed infection.

Fourth—Electricity in its various forms, actinic rays and mechanical vibrations, can be used for special purposes and as general tonics in the treatment of tuberculosis.

Fifth—X rays, as demonstrated by Gibson of Denver and Baemeister and Rickmann of Freiburg, Germany, promise the most certain and definite cure or relief in cases of pulmonary tuberculosis when managed efficiently and supported by the other well known measures, for the relief of this condition.

The Ethical Position of the Physiotherapist*

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I WANT to give you a little interval in a day of high scientific study, wherein we will discuss things that are not nearly as difficult to digest, and possibly quite as valuable. When asked to speak here, I selected this subject because these matters are puzzling to me. I have tried to solve some of them; yet I do not wish to take the position of coming and teaching you things and giving them to you as already digested and prepared. I want to take the attitude of talking things over and giving my ideas, and asking you if you agree with me; and to disagree if you see proper reason to do so.

I might introduce the subject by saying this: There are people within the territory of every one of us who are doing physiotherapy, who are not well accepted by the medical profession, who have purchased the apparatus, and who are exploiting the apparatus and their patients, and have, thereby, gotten a poor reputation among the medical profession, even though, as it seems to us, they have considerably padded their pocketbooks by so doing. We have groups that answer this description in every city.

We also know of men who are using physiotherapy apparatus in an unscientific manner. I think we should be rather careful about getting into these methods of procedure, because it does more harm to physiotherapy than anything else I can think of, in the eyes of scientific, thinking people. If you see a person carrying on a practice that speaks for quackery, even though he uses a reputable apparatus, in spite of yourselves you will get a prejudice against that thing. That, in my mind, explains a large amount of the prejudice that reputable and scientific people are entertaining against this particular therapy.

I do not think physiotherapy is a true specialty for, to use it most advantageously, it must be applied only when indicated. I like to think of a meeting of physiotherapists as

*Address given at the X Ray, Radium and Physiotherapy Meeting, Omaha, Jan. 5, 1925.

being very much like a meeting of Presbyterians, or democrats. We are interested in the subject of physiotherapy, but only as a crosssection of the medical profession. We happen to be interested in physiotherapy as a means of assisting us in our particular line of work—medicine.

These remarks will apply especially to the fellow in general practice in the smaller city. I think I can make an exception in the case of the man who is conducting the physiotherapy department of a large hospital, or who is doing a large amount of referred work, or the communities where the specialists thrive well, which must be the large communities. The man in the small city below 100,000 is the man who is usually doing a general practice; and a man like that is in a good deal of danger if he begins considering himself a specialist in physiotherapy. He will get into trouble from the very beginning. He will develop a tendency to set up a lot of machines and to run his patients through those machines one after the other in a mechanical fashion, regardless of what is wrong with them; and very soon he will no longer care; and after a while he will no longer know what is the matter; and he will be no better than the chiropractor or the man running the Abrams' machine, although he has an "M. D." after his name.

My contention is that the modern physician treats his patient with his brain, and not with any kind of apparatus; and the possession of apparatus no more qualifies you to call yourself a physician than a case of surgical instruments qualifies you to call yourself a surgeon or a doctor. A physiotherapist is still a doctor, even though he makes use of physical means to help him in his work.

One of the reasons I am putting a good deal of emphasis on this particular point is that it is almost a daily experience of mine to have some patient tell me he has come to get treatments from this or that apparatus; or he wants "these electrical treatments for diabetes," or something of that sort. I lose most of those patients because I explain that is not the way it is done. In order to get a treatment, he must submit to a thoroughly careful examination, and then he will receive whatever treatment he requires. If that should happen to be physiotherapy, it will be welcome; if not, he gets no physiotherapy.

That man usually goes to the fellow down the street who has a lot of physiotherapy apparatus and who will give him "electrical treatments" if he wants them.

My objection to that method of treatment is not only theoretical. I have gone ahead and tried it to see how it works out, for I am naturally of an experimental turn of mind. I have actually tried it on these people who came and asked for "electrical treatments." I turned them over to the technician and said, "Let us see what you can do." It almost invariably develops that the patient has some symptoms which resemble those of somebody else, and his pathological condition does not resemble it at all. Naturally, the doctor who gives him the treatments gets the blame. The patient says, "I have been to Dr. Breuer and he did not do me any good, and this electrical business is no good." He warns his neighbors and friends against it.

I have found a practical, as well as a theoretical and ethical justification for refusing to treat anybody on his own diagnosis. You can extend that and refuse to treat anybody on the diagnosis of somebody else, with possibly this exception: If some of your colleagues have patients they would like to receive physiotherapy and have not the apparatus, and request certain patients be given a certain kind of treatment at their responsibility, that is a different thing. But if a patient tells you Dr. Smith told him he had a certain trouble, or Dr. Jones said he should have his tonsils out, you do not know whether the doctor said that or not.

In the second place, we are apt to make misstatements and little inaccuracies of diagnosis. Possibly when he saw this man his symptoms might have been suggestive of a definite malady. When you see him it may be a different condition, and the treatment is unjustified.

I have a friend in Lincoln who is a layman. He was in our hospital unit in France and is now running one of these institutions where massage, electric light baths and that sort of stuff is given. One day he said, "I have a treatment by means of which I can cure these sacro-iliac backs." He requested me to give him a chance to prove to me that he could cure what he calls "sacro-iliac" backs.

I suppose he meant pain in the sacro-iliac region. I did not stop to explain the phraseology to him, but I think you can see the fallacy in such a statement—though it is one the best of us fall into occasionally. He has some sort of massage by means of which he can temporarily relieve pain in that region. He

does not know that pain there may be caused by a dozen different things so radically different that the treatment for one does not nearly approach the treatment for the other. The symptoms may come from flat feet, hip joint disease, female pelvic trouble, spinal arthritis or that general atonic condition of the abdomen known as visceroptosis. Now isn't it silly to suppose his little manipulation can cure those things? Yet he really believes he can do it.

That is an illustration to point out the fallacy of trying to apply certain routine treatment to a definite set of symptoms. It does not work. I am saying that because we all get into the same habit. Almost all of us are prone to do the same thing unless we make it a routine to subject each patient to the most careful examination we can give.

I have been up against this proposition: I have people who are not able to pay for the time it takes. An examination of that sort takes an hour, or perhaps a week. Some people won't pay for it. I believe it pays a fellow better to turn the patient down, if the condition is obscure, than to acquire the reputation of giving treatments and having people turn against you because you failed to recognize conditions, and your treatment has failed. It does not do harm to have people say you refused to take care of them, or charged too much. But it does harm to have them say, "I tried Dr. Breuer, and he was not able to help me."

That brings me to another thing we have all been up against in this part of the country. We have certain men handling this work who are doing a good deal of advertising. They are running advertisements in newspapers and sending out literature. Now, according to the American Medical Association's Code of Ethics, a man is permitted to advertise his equipment. If you have a hospital building or a clinic in some office building, with a lot of equipment, there is no objection to advertising it. On the other hand, you are not permitted to advertise yourself, either by referring to yourself as a specialist in some particular line, or stating what particular conditions you handle.

This has an excellent foundation in psychology. I think a doctor should not be considered as a fellow who goes around and brags of what he can do. Medicine is not on a sufficiently accurate basis today to enable anyone to say for sure what he can do in any individual case. None of us know for sure. We have strong reasons for thinking things, but we do not know.

The man who fixes your automobile tire can give you a rather positive assurance of what he can do for you. Your doctor cannot. Furthermore, I do not think it is morally the right thing to capitalize the misfortunes of other people and to present the appearance to the public eye of scrambling over the sick man. I think that is the basis of the ethical objection to advertising.

On the other hand, we have at our disposal the best kind of advertising there is, and that is selling your own personality and advertising by your own personality and by word of mouth. Even that is abused considerably.

I am here largely to give my criticisms on things medical men are doing that have gotten them into disrepute among their colleagues. I am saying it because I believe in this work and would like to preserve it on a reputable basis, and like to have everyone of us doing it to have a good reputation and be considered one of the foremost men in our communities. The better representatives of physiotherapy are the foremost men in their communities.

My criticism against the word of mouth advertising is that it is abused. There are certain men who go around among their friends and patients and tell wonderful stories about the miraculous powers of the electrical machine they have in their offices. I think that tends to detract from the value of it. I believe if you try, in answer to people's questions and in your conversation with them about these matters, to explain the thing on as scientific and conservative basis as you can—I think the people can understand it.

I believe it will increase their respect for you and give them the idea that you understand your subject and have really imparted to them some definite information that they did not have before. On that basis they are more liable to look for you when they need you than if you give a wonderful fairy story about the effects of the electrical machines. Besides, when you give that sort of an explanation, you won't be getting your foot into it if some of your scientific colleagues should get onto it.

We all know it is necessary to keep our patients' respect and to have something they do not quite understand. It is a very old fundamental strain in human nature—that mystery-worshiping element which believes in the

"Medicine Man" and the spiritualist. The most scientific of us have not yet discarded that. You are not losing anything by telling all you know, and you cannot tell them very much. There is still so much mystery left—so much that cannot be explained—there is plenty there to overawe and impress the keenest layman. You do not have to be afraid you will lost their respect.

I have taken the position if a man is conscientious and makes use of common sense and preserves his own self-respect and follows the Golden Rule, he is safe. If you are progressive and try to keep posted and are constantly active trying to get somewhere, you will run onto a few who will try to stir up trouble for you. I have turned up a few myself. If you will fulfill those requirements you will find most of your colleagues will be with you and for you and you will always have their support, and they will help you out of any ethical difficulty you encounter. I think the fellow who tries to rely on his own judgment will be in difficulty. If you keep in good standing your colleagues will help you out when you are in trouble; but you must give and take.

Another consideration is the question of liability of different kinds—for malpractice and accidents and injuries. Ever since I have been doing this work it has impressed me rather powerfully that sooner or later something is liable to happen to me. Perhaps some real highly strung, nervous lady will get a little spark from this machine, and be an invalid the rest of her life; or the quartz tube is apt to break and spill incandescent mercury all over your patient. Something like that is liable to happen, and somebody will try to get rich off of you.

I believe the fellow who remembers that and guards against it every day will protect himself and keep out of trouble.

The way I try to do is, first of all, to keep careful records of everything I do—examinations and all treatments. The technician has a little notebook in her pocket. When she puts a patient under the apparatus she puts down the time, and when she takes the patient out she puts down the time. We have stacks of those little books. If anybody gets me in court, at least I can show I have done everything humanly possible to make things go right and keep things straight. If you can show that to a court and jury you are reasonably safe. Proof that you have tried to keep things going smoothly will count more than hearsay evidence.

It goes without saying you should all carry medical insurance. I can say for your benefit, because I have gone into it thoroughly, that your policy with the Medical Protective Company of Ft. Wayne—I guess there is not anybody here who does not have one—will protect you against most accidents that might happen with physiotherapeutic apparatus.

There is a possibility of injury to your office help from some of these things. Accidents happen in spite of the best of us. I think it would be wise to protect yourself by insuring your technician or anybody who has contact with this apparatus at all. The only trouble I have had was one technician who would not take my word she ought to wear glasses around the ultra violet light, so she had sore eyes for a few days. I have not had any indications I might have trouble, but I am expecting it every day and getting ready for it. The fellow who does that will sleep easier when something does happen.

At the present time I think it is rather necessary we be careful and keep our heads, for we are getting more accurate knowledge of pathology—not only gross anatomical pathology, but pathological physiology—which to us folks who take it seriously, it seems it is more and more difficult to affect these pathological processes by any means at our disposal. The treatment as we used it—medicines and other means—seem illogical and futile. We are beginning to feel that pathology has us at its mercy. On the other hand, we have electricity and the wonders it is performing every day being exploited in the popular press and the technical press, with radio, automobiles, etc., performing unheard of things for us, and the deeply rooted idea that some miracle is the thing that is necessary to get us out of our trouble—people looking for some magical method of relief. We are in danger of allowing ourselves to be carried away and to become overenthusiastic about one particular method and to expect wonders of a hobby method.

I think Dr. Donnelly brought that out this morning, and also in a private conversation with me, that you cannot pin your faith to any one thing. Instead of limiting that to say you cannot pin it to one physiotherapeutic method, I want to say you cannot pin it merely to physiotherapy. It is one of the most valuable things we have, but it is not all.

If you think you can forget drug therapy and surgery and all other methods and use physiotherapy alone, I think you are doomed to travel a difficult path. Yet that is what the patients think of you. When people at large hear you have installed a good deal of electrical apparatus they think you have gone back on medicine, that they do not have to observe diet, and they can go on poisoning themselves and will get well.

That is what I mean by saying it is necessary that we keep our heads and remain well balanced. We must get all we can out of physiotherapy, yet if we expect too much we will be doing the cause a far greater harm than were we to throw it into a corner and ignore it altogether.

I would like to take a minute or two to report a case. I have mentioned it to several individuals, but would like to present it to this group.

Six months ago a young married woman came in complaining of amenorrhea. She was pregnant. She came in a week later complaining of pain in the right side. I examined her carefully at that visit and several times during the following three weeks. After careful deliberation, I diagnosed the condition as right ectopic pregnancy. The pain was continuous and rather severe. The mass in the right tube was quite distinct from the ovaries, and I had no doubt she had an ectopic pregnancy in the right tube. I talked surgery and told her she was in serious danger if she did not have something done. She could not bear to hear the knife mentioned, and said she would just as soon die as to be operated upon.

Her husband did not know what to do. He made frantic visits to the office. He begged me to try to think of something. I tried awfully hard. I inserted a copper electrode in the uterine cavity and a small pad electrode on the abdomen over the mass and pressed the two together as close as I could. I gave the lady a light anesthetic and sent a number of galvanic shocks through that mass of one-half ampere—500 milliamperes at 45 volts, making both the make and the break, in two different directions.

Her pain stopped within ten days after that, and menstruation came back two months thereafter. I last examined her one day last week, and the mass was practically gone. I can just barely find where it was. I think that is reasonably conclusive evidence for a diagnosis of ectopic pregnancy, which was killed by a galvanic shock, by which the patient was relieved by galvanism and surgery obviated.

Diathermy in Gynecology: With Special Reference to the Vaginal Electrode*

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IN my article under a similar title, which appeared in the November issue of the *Journal of Radiology*, I discussed the application of diathermy in the treatment of inflammatory diseases of the female pelvis in a general way. It was brought out in this article that diathermy, or internal heat, as I prefer to call it, has the following general effects:

1. It alleviates pain.
2. It has a localized action.
3. It increases the blood supply to the part.
4. It leaves no bad after effects.
5. Bacteria are either killed or attenuated in virulence according to their ability to resist high temperatures.

Special mention was made of the gonococcus which is attenuated in virulence and prevented from reproduction by a temperature of approximately 104 degrees Fahrenheit. Brief mention was also made of the heat tolerance of other micro-organisms, all of which were approximately that of the gonococcus.

At this time I introduced my new vaginal electrode, with instructions for its use, and in the following article I shall confine myself strictly to the technical application of this instrument and the specific effects obtained. For information relative to the diseases in which indicated, general diathermic effects, and indications and contra-indications for treatment, the reader is referred to the above named article, reprints of which will be gladly furnished on request.

CHARTING HIGH FREQUENCY APPARATUS

In giving vaginal treatments with the high frequency diathermy apparatus, either the high or low voltage coil may be used.

*Reprinted by permission of author and publisher—H. G. Fischer & Co.

In high frequency apparatus, as in x ray machines, there is a wide degree of variation in the amount of current delivered to the patient, and each machine should be charted.

It has been the custom in the past to place the electrodes where deemed necessary and raise the amperage to the patient's tolerance, and as a result the whole proceeding was of a haphazard nature, with sometimes beneficial, but quite often unsatisfactory, results. The machine or the treatment was condemned, when really the operator's technique was at fault.

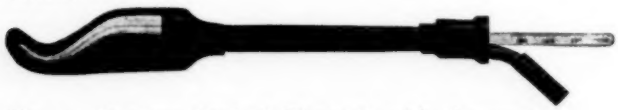

Fig. 1—Chapman Vaginal Electrode with thermometer.

What was needed, most of all, was a means of knowing the exact temperature produced within the tissues by the electric current. This means was provided when, not long ago, a thermometer attachment was perfected for use with the vaginal electrode.

Since using this attachment in connection with the improved Chapman Vaginal Electrode, Fig. 1, it seems quite possible to pass a considerable amount of current through the patient with very little heating effect, and as the efficiency of the high frequency treatment is dependent entirely on the degree of temperature produced within the tissues, the value of the thermometer attachment cannot be overestimated.

In charting my machine, tests were made on a woman of medium stature and weighing approximately 135 pounds. The vaginal electrode was inserted and the patient arranged for treatment in the usual manner. The indicator of the autocontrol was set at one and then gradually stepped up to the patient's heat tolerance, the amperage readings being recorded with each step. The spark gap was regulated to insure a steady, not intermittent, flow of current and the results graphed.

These tests were repeated on all treatments upon women varying in weight from 120 to 140 pounds and the results were approximately the same in each instance, a few pounds difference in weight making no appreciable difference in results.

Such a chart is of considerable value, as it gives the operator a check on what the machine is delivering to the patient. This chart also shows the relation of the heating effects obtained by both the high and low tension coils. By referring to this chart, it is seen that the same amperage is obtained by setting the autocontrol on point eight with the low tension coil as is obtained by No. 12 using the higher voltage. This is also of practical value, as the higher voltage occasionally produces cramps in the patient's legs when set too high, whereas this is not the case using the lower electromotive force, and still the same amount of heat is produced.

As already mentioned, care must be exercised to always have a steady flow of current across the spark gap. The amperage may be varied from 50 to 150 milliamperes by adjusting the gap, and a spluttering spark gap is to be avoided. It not only produces unsatisfactory therapeutic effects, but may cause Faradic contractions with discomfort or even danger to the patient.

EFFECT OF RESISTANCE ON AMPERAGE

The effect of resistance on the amperage obtained is another point to consider. While this is not marked, in the ordinary type of treatment, nevertheless the amount of tissue to be traversed by the current must be taken into consideration and the settings adjusted

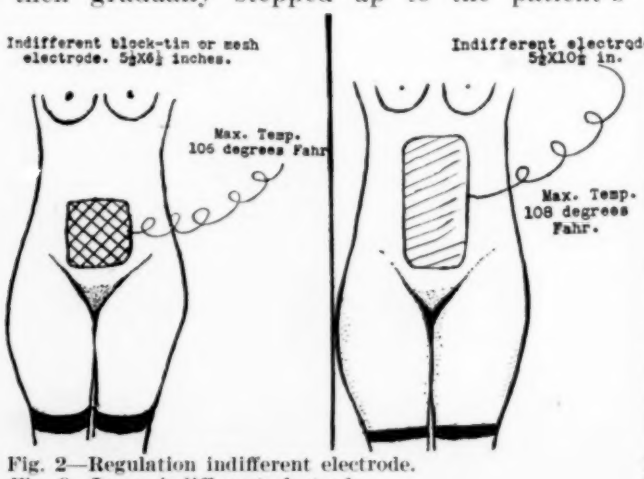
Indifferent block-tin or mesh electrode. 5½X6½ inches.
Max. Temp. 106 degrees Fahr.
Indifferent electrode 5½X10½ in.
Max. Temp. 108 degrees Fahr.

Fig. 2—Regulation indifferent electrode.
Fig. 3—Large indifferent electrode.

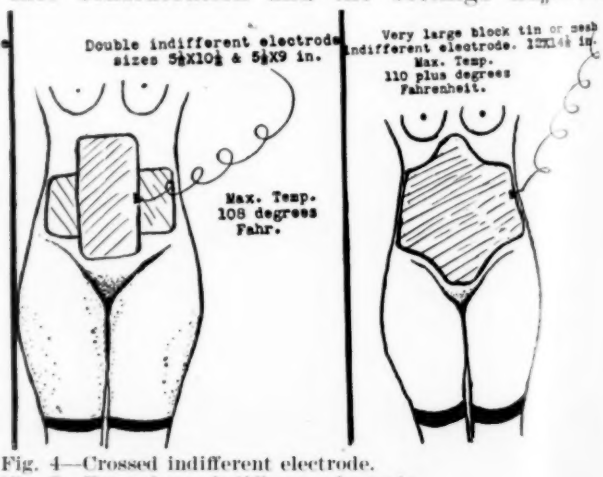
Double indifferent electrode sizes 5½X10½ & 5½X9 in.
Max. Temp. 108 degrees Fahr.
Very large block tin or mesh indifferent electrode. 12X14½ in.
Max. Temp. 110 plus degrees Fahrenheit.

Fig. 4—Crossed indifferent electrode.
Fig. 5—Extra large indifferent electrode.

to suit. This is a point that can be determined only by the experience of the operator. There is also a considerable variation in the resistance of the individual to the passage of the current. This resistance lies largely in the skin. Experiments carried out along this line demonstrate this fact. It has been found, however, that salt water, or soap lather to which a certain amount of sodium chloride has been added, reduces this resistance approximately 50 per cent, and we now coat the electrodes and skin with a paste made of Ivory soap flakes to which a small amount of sodium chloride has been added, or else use the special soap paste prepared for this purpose. This paste is put up in collapsible tubes and is very handy to apply. It contains the necessary ingredients in their proper percentage.

A great difference is obtained in using the abdominal electrode and in having the patient hold the autocondensation handle in her hands. In this diagram only 800 milliamperes of current was recorded on the meter when the autocondensation handle was used as the indifferent electrode, whereas 2,700 was obtained when the large block tin abdominal electrode was employed. This shows the advantage of employing a large block tin or silver mesh electrode in most types of work, and, I believe, explains the unsatisfactory results sometimes obtained by inexperienced physiotherapists in giving both surgical and medical diathermy. They failed to take into consideration the wide variation in diathermic effects occasioned by the resistance of the tissues. The autocondensation handle should be used for autocondensation treatments only and for all other work the block tin or mesh electrode, placed opposite and as near the site of operation as is practical, should be employed.

Diagram No. 2 shows the type of abdominal (indifferent) electrode commonly employed, and its proper location. This is a piece of block tin or mesh, and is 5½ by 6½ inches in diameter. It is applied over the lower abdomen midway between the anterior superior iliac spines, with its lower edge about two inches above the symphysis pubis. If it comes too near the bones a certain degree of sparking and unequal heating is produced, which is to be avoided. This is probably due to the greater density of the bones and their consequent higher resistance to the passage of the current.

Another point of importance is the unequal heating effects caused by the pubic hair. Until the pubis was shaved the intravaginal temperature could never be raised above 101 degrees Fahrenheit. Whenever it was attempted to go above that the patient invariably protested about a burning along the pubic edge of the indifferent electrode. The pubis is now shaved as a routine measure and we find that one of the most serious barriers to the success of the treatment has been eliminated. Inasmuch as the gonococcus is attenuated by 104 degrees Fahrenheit, it is imperative that such a degree of temperature be obtained.

By using the soap paste containing sodium chloride, and shaving the pubis, an indifferent electrode of this size will permit of an elevation of temperature within the pelvis to 106 degrees Fahrenheit, but no higher.

By employing a larger indifferent electrode as in Fig. 3 (5½ by 10½ inches), a temperature of 108 degrees Fahrenheit may be obtained. A cross electrode, as in Fig. 4, is quite comfortable and easy to apply, but does not add to the intravaginal temperature.

My most successful results have been obtained by a large form fitting abdominal electrode such as is illustrated in Fig. 5. Using this electrode, the thermometer readings of the Chapman Vaginal Electrode have been

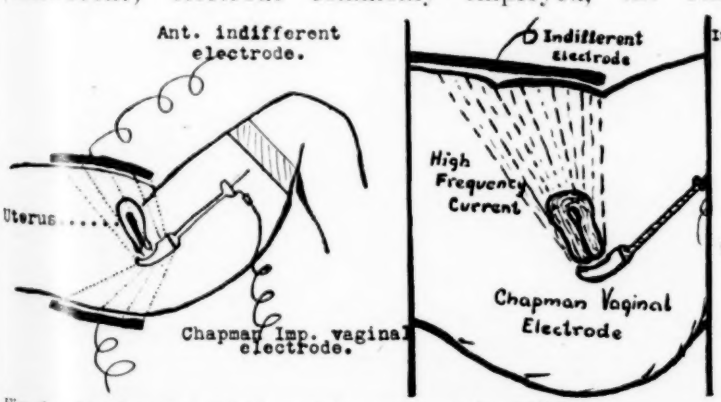

Fig. 6—Showing use of both anterior and posterior indifferent electrodes.
Fig. 7—Distribution of current.

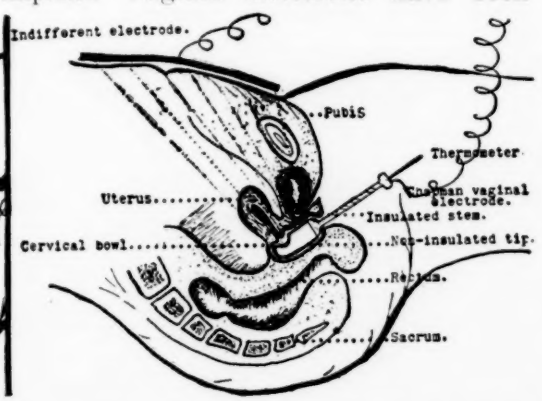

Fig. 8—Cross section of female pelvis showing Chapman Vaginal Electrode in position.

raised to approximately 112 degrees Fahrenheit, which is the heat tolerance of the tissues and is sufficiently high to produce an attenuation of the gonococcus and perhaps all other common types of pathogenic micro-organisms.

An indifferent electrode may be placed both anteriorly and posteriorly, using a bifurcated cord to make the connection, Fig. 6. While this would appear to be a uniformly satisfactory method of distributing the current in giving a general treatment to the female pelvis, still it is less satisfactory than the single abdominal plate method for heating effects, 106 degrees being the highest thermometer readings obtainable by this method. Its use in selected cases, however, is to be recommended.

CONCENTRATION OF CURRENT

Another point to consider in this connection is the relative concentration of the current, with relation to the position of the indifferent electrode. As we all know, the electrical impulses follow the path of least resistance; therefore, all other factors being equal, the greatest concentration of current should be

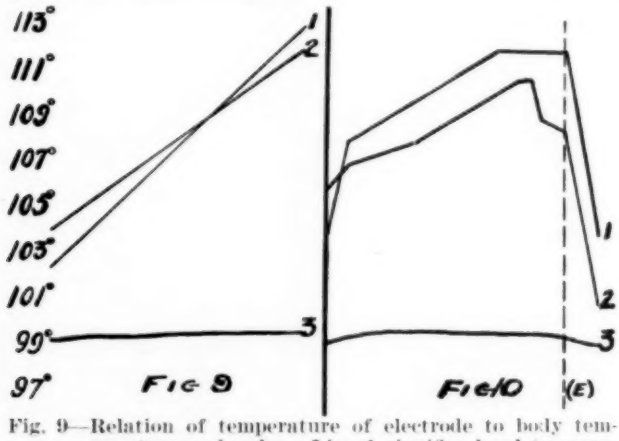

Fig. 9—Relation of temperature of electrode to body temperature and pulse. Line 1 signifies local temperature of electrode, line 2 pulse reading, and line 3 general temperature by mouth.

Fig. 10—Chart of typical diathermy treatment using vaginal electrode. Line 1 demonstrates pulse readings, line 2 focal temperature of electrode, and line 3 oral temperature of electrode—each taken simultaneously and culminating ten minutes after end of treatment. (E) Temperature charted vertically and milliamperes of current charted horizontally, beginning the treatment with 1400 and ending with 2500.

where the two electrodes are nearest to each other. The fact that the pubic hair produced so much interference to the passage of the current caused observations to be made along this line, and the effects were carefully observed on the skin.

Even after shaving the pubis, when the amperage is raised to the patient's tolerance the first appearance of reddening on the skin appears along the pubic margin of the plate electrode. The current has been pushed to the point of extreme discomfort to the patient and I find that the erythema first appears in this area and gradually fades out as it extends upwards. Another factor that interferes with the elevation of the amperage is the depression in the umbilicus. Any space beneath the indifferent electrode will produce sparking. To avoid this and to establish a uniform contact, the umbilicus must be filled with some good conductor. For this purpose the soap paste or liquid soap containing a small percentage of sodium chloride is used. Unless this is done it will not be possible to elevate the vaginal temperature above 103 degrees Fahrenheit without discomfort to the patient. Very graphically the relative distribution of the current in these treatments is shown, Fig. 7. It has been claimed by some writers that there is a crossing of the electrical impulses at a point between the two electrodes and this opinion is supported by experimental evidence. This effect, however, does not appear in these treatments and it would be a bad thing if it did, as such an action would cause a necrosis of the internal tissues that would be exceedingly disastrous.

LETHAL TEMPERATURES

Below are given the heat tolerances of various micro-organisms. This data is taken from the published reports of a number of eminent bacteriologists, and its accuracy is beyond question. The lethal temperatures in vitro of a few of the more common of these are as follows:

Streptococci—110-125 degrees F., in from ten to twenty minutes.

Staphylococci—140 degrees F., in approx. thirty minutes.

Tubercle bacilli—140 degrees F., in approx. twenty minutes.

Gonococci—140 degrees F., in approx. thirty minutes.

You will note that the lethal temperature of the gonococcus is as high as any of the others and much higher than that of the streptococcus, that deadly micro-organism that is responsible for perhaps 90 per cent of the deaths from septicemia originating from criminal operations and occasionally following child birth. Taking this factor into consideration, think how many unfortunate women may be saved by this valuable modality if used in time.

The degree of temperature required to attenuate other bacteria is not as well known as

that of the gonococcus, but observations have been made which indicate that the gonococcus is above the average in resistance, and this observation is borne out by the figures quoted above. Corbus and O'Conor state that the gonococcus is killed (in vivo) by 104 to 108 degrees F., in forty minutes. This statement does not compare with my observations, which would indicate that it is rather optimistic. However, the effect of the blood stream upon the bacteria must be taken into consideration. Induced by the high temperature, there is a great influx of blood to the part with a concentration of the opsonins, agglutinins and other bacteriolytic enzymes of the blood stream with a consequent attenuation of the invading micro-organism and greater phagocytosis, *i. e.*, a raising of the opsonic index and a stamping out of the infection by nature's process. This action, combined with the specific action of the heat upon the micro-organism, accounts for the difference in the resisting power of the bacteria to the action of heat in vivo and in vitro.

HEAT TOLERANCE OF PATIENT

Another point for discussion. It has been stated by some physiotherapists that the normal tissues will resist temperatures of from 130 to 160 degrees F., without damage. Observations made at this clinic certainly do not support the above statement. In order to test this point, a number of persons immersed their hands in water heated to their tolerance. The average temperature that could be tolerated with comfort was 112 degrees F.

I was able to hold my hand in water heated to 115 degrees F., but the skin was quite reddened and I experienced considerable discomfort. One woman who was accustomed to having her hands in hot water could tolerate 120 degrees F., but this was the exception. These findings are in line with the heating effects we have obtained with the electrode, as no patient has, as yet, tolerated a temperature above 112 degrees F., and all complain when the thermometer registers above 111 degrees F. However, this temperature is well above the 104 to 108 degrees F., generally accepted as necessary for the successful stamping out of infections.

FEATURES OF THE ELECTRODE

The Chapman Electrode is constructed to conform with the anatomy of the parts to be treated. The instrument should be lubricated with glycerine or soap lather, preferably the latter, and is rotated at an angle of 90 degrees from the horizontal plane for introduction into the vagina. As soon as the body of the electrode passes the external vaginal orifice it virtually snaps into position and requires considerable force to remove it. After introduction, the electrode is pushed to the extreme posterior fornix of the vagina and then rotated to the horizontal position. When this is done the cervix uteri is automatically engaged within the cervical bowl and is held there, while the anterior lip of the cervical bowl enters the posterior forchette, so that there is no portion of the field that is not covered by the current.

The value of this factor in the treatment of endometritis can readily be appreciated. The hymenal portion of the vagina closes around the insulated vulval groove and helps to hold the electrode in proper position.

Another factor: the vagina tolerates temperatures in excess of that of the skin, so that with this instrument it is possible to elevate the intravaginal temperature greatly in excess of what would be possible if the noninsulated tip came into contact with the external skin. The cord connection should pass down between the legs of the patient and by its downward pull elevate the uterus and bring it closer to

Fig. 11—Introduction of Chapman Vaginal Electrode.
Fig. 12—Treating vulvitis and inflammations of external genitals, using mesh sponge or active electrode.

Fig. 13—Treating inflammatory diseases of the internal female organs.

the indifferent electrode on the abdomen above, permitting greater concentration of electrical energy, and also aiding in preventing the electrode from rotating.

Employing this improved electrode, which carries a thermometer that registers accurately the degree of thermic effect obtained at all times, one knows exactly what is being done. It is hard to conceive that so simple a thing as the pubic hair, or the umbilical depression should make a difference of 10 degrees in the heating effects and decide for the success or the failure of a valuable therapeutic agent, but such proved to be the case, and the value of this thermometer attachment cannot be overemphasized. In simple language, it takes the treatment of gynecological infections by diathermy out of the field of guesswork and makes it a truly accurate and scientific procedure beyond the scope of mere luck as has been true to a large degree heretofore.

A midsagittal view of a female pelvis showing the electrode in proper position and its relation to the location of the pelvic viscera should be kept firmly in mind, Fig. 8. The dotted lines indicate the course of the current. By this diagram the wide scope of therapeutic possibilities may be appreciated.

Graph No. 9 gives the mean of 50 treatments in women ranging in weight from 120 to 140 pounds. I wish to call your attention to how the pulse rate runs almost parallel with the temperature readings of the electrode, also how the general temperature of the body is elevated less than one-half of one degree. This is brought out more graphically in the single treatment graph, No. 10. These charts are self-explanatory and their study gives much useful information. Note how, in this treatment, the temperature of the vaginal electrode, which stood at 110½ degrees F., dropped one and one-half degrees when the patient broke into a profuse perspiration, although the voltage and amperage were maintained the same. The pulse, however, as well as the general temperature was unaffected. This was undoubtedly caused by a vasodilatation with a great influx of blood to the pelvis induced reflexly by the high temperature, which, as you will note by referring to the graph, had about reached the tissue tolerance.

This is a beautiful illustration of how nature provides for emergencies, and, in this instance, attempts by the neutralizing action of the blood stream to combat the excessive temperature which threatens the life of the normal tissue cells. The value of this great influx of fresh blood in the stamping out of an infection can be appreciated. I also wish to call your attention to how the temperature and pulse readings fell almost parallel with each other and were restored to the normal in ten minutes, while the general temperature curve dropped to its normal almost immediately. This patient had a bad intra-uterine infection and was already running a temperature of 99.2 degrees F. The relation of the amperage to the intravaginal thermometer readings is given on both of these graphs. Their comparison is very interesting and instructive. They show exactly what may be expected at given autocontrol settings, and if such effects are not obtained, there is an error in the technique somewhere, or in the apparatus, and it should be corrected.

SUMMARY

Only the more potent factors have been mentioned in this article, but if the reader will study the graphs and drawings he will readily acquire a vast amount of valuable information, not only regarding the treatment in gynecology, but about diathermic effects in general. The main factors to which I wish to call attention are:

1. The application of diathermy in the treatment of pelvic infections in women, especially those caused by the gonococcus.

2. The application and advantages of the improved vaginal electrode with the thermometer attachment.

3. The influence of the size, shape and position of the indifferent electrode on the thermic effects obtained; also the influence of the umbilical depression and the pubic hair in producing a poor conductivity of current, thereby preventing an elevation of the temperatures sufficient to obtain satisfactory therapeutic effects.

4. The temperature tolerance of the tissues, which, contrary to statements generally accepted heretofore, was found to be approximately 112 degrees Fahrenheit.

5. The relation of the pulse curve to the temperature readings of the vaginal electrode; also the fact that, while the local temperature may be elevated almost to the point of cell coagulation, there is less than one-half of one degree elevation in the general body temperature.

6. The rapid restoration of the pulse and temperature to normal, following treatment.

Previous to the use of this special vaginal electrode with the thermometer attachment, the treatment of pelvic infections in women by diathermy was largely a matter of guesswork, although very satisfactory results were often obtained. Now, however, we have a therapeutic agent of great efficiency by means of which we may compute our dosage accurately, avoid sources of error and treat infections of the internal female organs with a scientific degree of accuracy and a high percentage of success.

Thrombo-Angiitis Obliterans of the Hand*

C. L. HUSTEAD, M. D.,
Falls City, Nebraska.

IN presenting the subject of *Thrombo-Angiitis Obliterans,* a review of the pathology will help us to understand why we may expect more relief from this condition by the use of diathermy than from other methods of treatment.

PATHOLOGY

Thrombo-angiitis obliterans is an inflammation involving, in most cases, the deeper vessels of the extremities. Soon after the inception of the lesion, occlusive thrombosis occurs, which later gives away to a stage of healing or organization, the end result being the closure of the arteries and veins over a large extent of their course by vascularized and canalized connective tissue.

Thrombo-angiitis involving the hand manifects itself in the beginning with more or less indefinite pains in the wrist, palm and the fingers, the patients being disturbed in their work by these symptoms or by cramplike sensations and later numbness of the fingers. There may be a stage of rubor and absent pulsations with ischemia on elevation and after a lapse of weeks or a few months trophic disturbances make their appearances, usually in the form of a dry dead patch of skin at or near the tips of the fingers, and at this stage the pain becomes very severe, both day and night. If the disease progresses gangrene will result. Thrombo-angiitis involving the fingers may be present without the loss of either the radial or ulnar pulse.

With a history of intermittent claudication, migrating phlebitis or typical thrombo-angiitis obliterans, one hand may become affected by sudden pallor followed by cyanosis which is often relieved by warmth. Later trophic changes may develop, with formation of scales or small gangrenous patches.

Physical examination at this time shows one or two fingers cold to the touch, the radial or ulnar arteries may or may not be pulsating. Other patients may have trophic disorders only. Pathology of the acute stage presents an inflammatory process involving all the coats of the vessel. The lumen is filled with occlusive thrombosis and finally formation of miliary giant cell foci, then the stage of organization or healing and the canalization of the clot and disappearance of the inflammatory products.

DIFFERENTIAL DIAGNOSIS

In diagnosing thrombo-angiitis obliterans, one must think of other organic vascular diseases of the extremities, such as arteriosclerotic gangrene, endarteritis obliterans, embolic or thrombotic gangrene and neuropathic vascular disorders of which Raynaud's disease is the principal one.

SYMPTOMATOLOGY

The following symptoms are characteristic for this disease: There is indefinite pain in the hand, palm and fingers and a feeling of numbness and coldness preceding the trophic changes, such as impaired growth of the nails, slightly atrophic condition of the skin, the slow course of the disease terminating in ulceration and gangrene. In the first stages there is a progressive development of typical manifestations of impaired circulation, such as blanching of the extremity when it is elevated above the horizontal and hyperemia in the dependent position. Occasionally there is disappearance of the pulses of the collateral digital arteries of the hand involved and sometimes the ulnar and radial.

CASE REPORT

Mr. E. C. S.—Age, 36; Race, American; Sex, Male; Martial, Married; Occupation, Electrician.

Past History—In childhood had middle ear disease, which left the hearing in right ear im-

*Read at the Third Annual Meeting of the American College of Radiology and Physiotherapy, Chicago, Nov. 13, 1924.

paired. No previous illnesses or injuries except a recurring headache since childhood; and in 1920 he froze the fingers of both hands and toes of both feet and the glans penis. As to habits, he uses no alcohol, but is a cigarette smoker.

Present History—During November, 1923, patient complained of indefinite pain in the palm and index finger of right hand, and the fingers became cold easily. In May, 1924, the fingers became sensitive and extremely painful, at first involving one-half of the palmer surface of the terminal phalanyx of the index finger. In the course of three weeks the middle and ring fingers were involved with a callous, the pain increasing in severity. At this time no pulse could be felt in the index or middle fingers; however, the pulse was felt in the proximal phalaynx of ring finger. The fingers beyond the middle and terminal phalanges were blanched, cold and calloused on the edge.

Physical Examination—Examination August, 1924, reveals nothing aside from the local findings, except a perforated tympanic membrane and a right direct inguinal hernia.

Laboratory Examination—Blood Pressure—130 over 85; Urine—negative; Wassermann—negative.

Local Findings—The index, middle and ring fingers of the right hand were as cold as those of a cadaver. On the ball of the index and ring fingers there was a callous covering the whole surface which had practically sloughed on the index finger leaving an indolent ulcer.

Progress and Treatment—Previous treatment with narcotics and heat gave but very little relief. Pain markedly worse upon elevation and considerably relieved when held in the dependent position. Pain required the patient to lay at night with the arm hanging over the edge of the bed in order to secure his rest. The patient was referred at this time by Dr. Wm. Shepherd of Rulo, Nebraska, to the Falls City Hospital for treatment, where he was given diathermy with the following technique: The tips of the four fingers of the right hand were immersed with the active electrode in a basin containing salt water, with the indifferent electrode placed just above the elbow. From 200 to 250 milliamperes of current were used for a period of twenty minutes, this being the maximum amount of current tolerated without increasing the pain. The hand received treatments at intervals of two days for three treatments, then intervals of three days for two treatments and again in one week. First treatment relieved pain completely for a period of ten hours, at which time it gradually returned and became very severe and the patient continued to have pain during the course of his treatment. At the same time the trophic condition rapidly improved and the ulcer healed, the patient remarking that he could not understand why the pain would continue when his fingers looked so good. At the end of three weeks the callouses had separated and the ulcer had healed, leaving a very thin, delicate skin on the site of the old callouses which was exceedingly painful to the slightest touch. Two weeks later when the epidermis had thickened and toughened, the pain ceased. At the present time, three months after treatment, the patient had completely recovered from pain and is following his vocation as an electrician with no discomfort. The remaining evidence of the disease is noted by the atrophy of the balls of the fingers, leaving the terminal phalanges close beneath the skin.

SUMMARY

Diathermy relieves pain by increasing the supply of fresh blood to the parts treated, at the same time dilating the veins and capillaries and producing an increased collateral circulation which relieves congestion and frees the tissues of waste products. It particularly increases the activity of the cell—the chemical workshop of our body thus restoring tissue to its normal condition.

EDITORIAL

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Published monthly at Omaha, Nebraska by the Radiological Publishing Company.

A. F. TYLER, M. D.
Managing Editor

ANNUAL MEETING

AMERICAN COLLEGE RADIOLOGY AND PHYSIOTHERAPY

CHICAGO
Oct. 19, 20, 21, 22

—o—

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THERE is every indication that the forthcoming meeting will be a most notable one in the history of our profession. It is entirely unnecessary for editorial comment to be made on the merits of such a program, for one has only to study the list of names and subjects contained therein to realize that a valuable wealth of material is being presented by some of the leading men in the medical profession.

This extensive range of material presented should interest every medical man, whether general practitioner, surgeon, internist or radiologist. We sincerely wish that every medical man interested in advancing the science of medicine will attend and take an active part in the discussions so that all may profit by the interchange of ideas and receive the viewpoint of his fellow practitioners.

MONDAY, OCTOBER 19, 1925

CLINICS

Wesley Hospital—
"Industrial Physiotherapy" *Paul Magnuson, M. D.*

Cook County Hospital—
"General Physiotherapy" ..... *J. S. Coulter, M. D.*
"Electrocoagulation of Malignant Tumors" ..... *Frank J. Novak, Jr., M. D.*
"General Physiotherapy" ..... *Disraeli Kobak, M. D.*

American Hospital—
"Cancer Clinic" ..... *T. Howard Plank, M. D.*
Hollender and Cottle Clinic—"Physiotherapy in Eye, Ear, Nose and Throat Practice" .....
A. R. Hollender, M. D., and M. H. Cottle, M. D.

TUESDAY, OCTOBER 20, 1925

Registration

Business Session

Presidential Address—"The Past, the Present and the Future"—*Curran Pope, M. D.*, Louisville, Ky.

"Status of Radiotherapy in Otolaryngology,"
Ira O. Denman, M. D., Toledo, Ohio, Otolaryngologist.

"Radium Therapy,"
C. W. Hanford, M. D., Chicago. Consulting Radium Therapist Cook County Hospital.

"Radiation Therapy,"
J. R. Ranson, M. D., Denver Colo. Formerly Consulting Physician Colorado Radium Company.

"The Radiological Diagnosis of Early Pulmonary Tuberculosis,"
Roland G. Breuer, M. D., Norton, Kans. Assistant Physician Kansas State Sanatorium for Tuberculosis.

"The Value of Actinic Therapy and X-ray in the Treatment of Pulmonary Tuberculosis—A Preliminary Report,"
R. W. Fouts, M. D., Omaha, Nebr. Roentgenologist Lord Lister Hospital.

"Artificial Light Therapy in Tuberculosis,"
Edgar Mayer, M. D., Saranac Lake, N. Y. Physician Saranac Lake Sanatorium for Tuberculosis.

"Quartz Light Therapy in Otolaryngology,"
Roy A. Barlow, M. D., Madison, Wis. Otolaryngologist University of Wisconsin.

"Water as a Therapeutic Agent,"
Charles E. Stewart, M. D., Battle Creek, Mich. Physiotherapist Battle Creek Sanitarium.

"Therapeutic Exercise—A Neglected Method in Physiotherapy,"
J. C. Elsom, M. D., Madison, Wis. Physiotherapist University of Wisconsin.

"Galvanism—Its Availability in Gynecology,"
J. U. Giesy, M. D., Salt Lake City. Editor *California and Western Medicine.*

"Why I Use Ultra Violet Energy in the Practice of Medicine,"
Leo C. Donnelly, M. D., Detroit, Mich.

EVENING SESSION

Subject to be Announced,
W. T. Bovie, Ph. D., Professor of Biophysics Harvard Medical School.

Fellowship Gathering and Smoker.

WEDNESDAY, OCTOBER 21, 1925

"Some Uses of Irradiated Dyes in Medicine,"
J. G. Walsh, M. D., Woodbine, Ia.

"Galvanism in Ulcers and Fistulæ,"
Miles J. Breuer, M. D., Lincoln, Nebr.

"Diathermy in Gonorrheal Diseases of the Male,"
Damon Brown, M. D., Madison, Wis.

"Diathermy in Gynecology and Genito-Urinary Practice,"
B. H. Hager, M. D., Madison, Wis. Urologist, University of Wisconsin.

"Diathermy on Medical Kidney Disease,"
Gustave Kolischer, M. D., Chicago. Associate Professor Genito-Urinary Diseases. Post Graduate Medical School.

"Surgical Diathermy in Papillomata of the Bladder with Demonstration of Patients,"
F. L. Nelson, M. D., F. A. C. S., Ottumwa, Ia.

"Bladder Tumors as Treated by Thermo-Electric Coagulation,"
B. C. Corbus, M. D., Chicago. Inventor of Thermaphore for Treatment of Endocervicitis by Diathermy. Author of Book on this Method of Treatment.

"X-Ray Therapy Twenty Years Ago,"
William Allen Pusey, M. D., Chicago. Past President American Medical Association. Professor of Dermatology, University of Illinois Medical School.

"Newer Methods in the Treatment of Defective Hearing,"
M. H. Cottle, M. D., Chicago.

"The Use of the High Frequency Currents from the Surgeon's Standpoint,"
A. David Willmoth, M. D., Louisville, Ky.

6:30 P. M.

Annual College Dinner—Educational Program,
Wm. Allen Pusey, M. D., Past President American Medical Association.
Maurice Fishbein, M. D., Editor Journal American Medical Association.
D. J. Davis, M. D., Professor Pathology and Bacteriology, University of Illinois Medical College.

THURSDAY, OCTOBER 22, 1925

"Blundering Diathermy,"
B. B. Grover, M. D., Colorado Springs, Colo.

"Appendicitis, Its Diagnosis,"
W. A. Rush, M. D., Beatrice, Nebr. Roentgenologist Hepperlin Clinic.

"X-ray Diagnosis of Dental Infections,"
S. A. Levey, M. D., St. Louis, Mo.

"Electro-Coagulation in the Treatment of Malignancies,"
A. Oaks, M. D., Preston, Ont.

"Diathermy in Infections,"
W. B. Chapman, M. D., Carthage, Mo. Vice President American College Radiology and Physiotherapy.

"The Treatment of Non-Union or Delayed Union of Bone and Bursitis,"
F. B. Granger, M. D., Boston, Mass. Radiologist and Physiotherapist, Boston City Hospital.

"Observations on Physiotherapy Abroad,"
Disraeli Kobak, M. D., Chicago. Attending Physiotherapist Cook County Hospital.

"Electrothermic Methods in Surgery,"
Wm. L. Clark, M. D., and *H. H. Bass, M. D.*, Philadelphia, Pa. Dr. Clark is a pioneer in the use of electrocoagulation in surgery.

"Endocrines and Physiotherapy,"
Maxmilian Kern, M. D., Chicago. An internist of wide experience in endocrinology.

"The Treatment of Burns by Radiotherapy,"
E. B. Kessler, M. D., St. Joseph, Mo.

"Dermatology and Ultra Violet Therapy,"
Lynne B. Greene, M. D., Kansas City, Mo.

"The Part that Electrotherapy Plays in the Correction of Disease,"
W. P. Grimes, M. D., Kansas City, Mo.

"Physiotherapy in General Practice,"
L. S. Merrill, M. D., Ogden, Utah.

Many others whose subjects are now being arranged will appear on the program.

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To take advantage of this reduced rate, you must secure a certificate from the agent selling you the ticket. This certificate must be presented at the meeting for validation. Return fare can then be purchased at one-half the regular rate by presenting the validated certificate to the agent. A similar certificate should be secured for each dependent member of your family who accompanies you.

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From Colorado (except Julesburg), Montana, New Mexico, Utah and Wyoming, October 8 to 11, inclusive, and October 16 to 18, inclusive.

From Arizona, British Columbia, California, Idaho, Nevada, Oregon and Washington, October 7 to 10, inclusive, and October 15 to 17, inclusive.

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An International Radiological Association

SHORTLY after the World War, a committee of university instructors in roentgenology was formed in Vienna for the purpose of exchanging ideas and obtaining a view of the progress made in this field. Letters stating the purpose of this new organization were sent to many of the roentgenologists in foreign countries; and sixty-one university instructors have contributed literary and scientific material to aid in the development of this valuable work. These sixty-odd instructors represent many governments: Germany, Austria, Russia, Switzerland, Roumania, Jugoslavia, Hungary, Czechoslovakia and the United States.

In all probability many university instructors in medical roentgenology have not received this circular questionnaire, due to insufficient information. Those who have not yet received this letter are cordially invited to participate in this work. Through the collection at a central point of this information on the progress of roentgenology, outlines of courses, lists of instructors and other valuable data, further progress is hoped to be stimulated. The names of the organizing committee comprise those of Professors Haudek, Holzknecht, Kienbock and Weber. The first official publication of the International Association of University Lecturers in Radiology is published in full in the first portion of this issue.

The American Electrotherapeutic Association

THE annual session of the American Electrotherapeutic Association will be held September 15th to 18th at the Hotel Drake, Chicago, Ill. Papers will be read by the leading men in the field of physical, therapeutics and by invited guests of national reputation. A demonstration of actual technique of application of the various physical modalities will be given. There will be a complete exhibit of the latest electrotherapeutic apparatus and accessories. All legally licensed physicians are welcome and detailed program can be obtained by addressing Dr. Richard Kovacs, Secretary, 223 East 68th Street, New York City.

Medical Society of Missouri Valley

THE preliminary program for the Missouri Valley Medical Society annual meeting, to be held in St. Joseph, Mo., September 30-October 1 and 2, 1925, contains members of the Nebraska, Kansas and Missouri Universities, together with staff men from the Washington Boulevard Hospital, Chicago, and practitioners from Des Moines, Iowa. Material that is embodied in the program should call forth a special effort on the part of the Missouri Valley medical men to receive the benefit of the teachings from our greatest of midwestern faculties.

American Board of Otolaryngology

THE next examination given by the American Board of Otolaryngology will be held at the Cook County Hospital, Chicago, on October 19th, 1925. Application should be made to the Secretary, Dr. H. W. Loeb, 1402 Grand Boulevard, St. Louis, Missouri.

ABSTRACTS and REVIEWS

GASTRO-INTESTINAL SYSTEM

The Value of the X Ray Diagnosis in Gastro-Intestinal Lesions. VERNON M. MOORE, A. B., M. D., J. Michigan State M. S., 24:148-150, March, 1925.

WITH the increased knowledge of the roentgen ray, diagnosis of gastro-intestinal lesions has been greatly facilitated. Approximately one-half the cases referred for gastro-intestinal study will have organic pathology in this tract. The majority of these can be shown with the x ray. An additional 10 per cent of organic lesions outside this field will be discovered in the course of the examination, so that the x ray should give positive evidence in about 60 per cent of the cases. Negative findings are frequently of value, also.

A great deal of the value of the roentgen ray report depends upon amount of experience of the roentgenologist and to the pains which he may take with each individual case. Blackford and Dwyer of Seattle state that the x ray will, in careful and competent hands, give diagnoses as follows: Esophageal lesions, 98 per cent—this includes spasm, organic stricture, diverticuli, external pressure, foreign bodies, etc.; gastric ulcer, 86 per cent without and 93 per cent with the use of clinical findings; 98 per cent of carcinomas of the stomach; 94 per cent of duodenal ulcers; 50 per cent of gall stones; 50 per cent of gallbladder disease, and 80 per cent of carcinoma of the bowel.

The x ray forms a valuable part of every gastro-intestinal study and materially aids in the diagnosis. It does not supplant an accurate history or physical findings, or any other laboratory aid; it supplements. The proper correlation of all findings is the duty of the clinician, and not the radiologist. The x ray shows numerous gastro-intestinal lesions beautifully, but has definite limitations of which the clinician should be aware. The radiologist has a responsbility in doing good technical work; in making a sufficiently intensive study, both by fluoroscopy and radiography, and then to presume no farther than his findings actually warrant. The clinician should insist upon definite and positive evidence, and should not be influenced too strongly by mere contributory signs and portents. Where positive findings are absent, he should not depend upon the x ray too implicitly. The clinician has a definite responsibility in properly working up the case, for then he can fit the x ray findings into the final diagnosis.

Diverticulum of the Duodenum. P. F. Butler, M. D., and Max Ritvo, M. D., Boston M. & S. J., 192:705-712, April 1, 1925.

DIVERTICULUM of the duodenum is an important pathological condition because it is not infrequently the cause of severe abdominal symptoms. This condition is usually present in the second portion of the duodenum, although it may be present in any part and any surface of the duodenum. It may be congenital or acquired. Congenital diverticula may be present throughout life and never be suspected until revealed by roentgen examination. Often there are no symptoms produced; but when symptoms are present they are usually the result of foreign bodies as particles of food lodging in the sac and producing mechanical inflammation of the sac and the surrounding structures, or distension of the pouch. These symptoms are so indefinite and variable that clinical diagnosis is practically impossible. Diagnosis can seldom be made except by the use of the roentgen ray and the fluoroscope. Treatment of the condition is always surgical if the symptoms are severe, otherwise no therapy is indicated.

The Early Diagnosis of Cancer of the Large Bowel. John Homans, M. D., Boston M. & S. J., 192:695-704, April 9, 1925.

AFTER a careful consideration of the pathological physiology of the colon, and a review of the symptoms generally presented by the patient suffering from pathology in the lower bowel, the author considers the symptomatology and diagnosis according to the anatomical location:

1. In the right side of the colon, cancer symptoms are suggestive of subacute appendicitis, tending to appear in attacks in which the constitutional and local signs are less marked than the patient's sensation suggests; possibly local soreness or distention of the bowel, and quite probably, since tumors in this region are often cellular and bleed easily, a noticeable degree of anemia.

2. Cancers in the transverse colon cause attacks of low abdominal cramp or colic sometimes associated with vomiting, and in a majority of instances some degree of constipation; not infrequently, bleeding from constipation and discomfort between attacks.

3. In the descending colon and sigmoid flexure, either of two types of symptoms may be presented by cancer: (1) A type marked by mild attacks of gaseous discomfort and low abdominal cramps, sometimes but not necessarily associated with a moderate degree of constipation; in some instances distinguished by sensations of intestinal motion directed toward the point of obstruction and ending at that point with relief, a gurgle and usually with the passage of gas, and (2) a type marked by steadily increasing constipation ending in obstruction.

4. Cancer in the recto-sigmoid portion of the descending colon presents symptoms similar to those due to obstruction in the sigmoid proper, but tending even more to constipation, to an association of low abdominal discomfort with a desire to defecate or actual tenesmus, and to the presence of blood upon the stools.

5. For the colon in general and without re-

gard to other symptoms, the presence of gross or microscopic blood in and upon the stools and to attacks of diarrhea (whether or not the result of catharsis), anemia (especially in cancer of the right colon and lower sigmoid) and a varying degree of loss of weight.

After a careful elicitation of the history and a general physical examination, one should insist upon the stool examination, especially for blood, proctoscopy, and the x ray study of the barium enema at the earliest possible moment in every suspected case of cancer of the colon. Although these routine laboratory examinations should always be done in suspected cancer of the colon, the x ray examination with the barium meal is by far the most valuable and will show a filling defect long before the symptoms are distinctly evident.

Diverticulum of the Large Intestine Communicating With the Urinary Bladder. CHARLES MORGAN MCKENNA, M. D., J. Urology, 13: 443-451, April, 1925.

AN early diagnosis is most important when dealing with diverticula of the large intestine, for it will determine the extent of the operation and prevent complications. For diagnosis a barium enema or barium meal should be used in conjunction with x ray, for the location of the fistula is of consequence to the operator. It is a well known fact to surgeons that all diverticula communicating with the urinary bladder are surgical risks.

Diverticula of the sigmoid are congenital or acquired, and while no definite conclusion has been reached as to the etiology, the writer believes local peritonitis, constipation, chronic colitis, traumatic nerve lesions and pathology of the neighboring organs adjacent to the sigmoid may have some possible bearing on the cause.

In the cases reported by the author, fecaliths were present in the diverticula.

Gallbladder Shadows. CHARLES D. ENFIELD, M. D., Kentucky M. J., 23:100-106, February, 1925.

A NORMAL gallbladder is so infrequently seen by the pathologist or surgeon that it offers a refuge for conviction of many hazy upper gastro-intestinal disorders. If the history is not typical, the diagnosis becomes difficult to establish unless the x ray evidence is unexpectedly helpful.

Heretofore, the diagnosis of gall stones by the roentgen ray depended upon the increased density of the stones. As a rule, however, cholesterol forms from 20 to 90 per cent of gall stones, and the density of cholesterol is considerably less than that of water and is correspondingly transparent to the x ray beam.

It was felt up to 1924 by roentgenologists that a careful weighing of the evidence obtained from the direct films of the gallbladder region, together with that obtained from the barium meal examination, was giving them a fair degree of accuracy in the diagnosis of chronic cholecystitis with or without stones. This contention was fairly conclusively disputed by Carman, McCarty and Camp of the Mayo Clinic in February of 1924.

About this same time, Graham and Cole of St. Louis reported a procedure for roentgen examination of the gallbladder which appears to be the greatest advance in roentgen diagnosis since the introduction of pyelography. The new technique was based upon the administration of a compound of tetrabromphenolphthalein. The technique for administration is as follows: The patient prepares for the injection by admitting breakfast. No other preparation is necessary. The dye, sodium tetrabromphenolphthalein, is obtained in ampules containing 5.5 grams of the dry substance. For patients of 120 pounds or over the entire ampule is used, its contents being dissolved in 40 c.c. of distilled water, filtered through a gauze, made up to 40 c.c. and sterilized over a boiling water bath for fifteen minutes. After sterilization the solution is allowed to cool, when it is ready for injection. It is then injected slowly intravenously into any convenient vein, in two doses of 20 c.c. each, the dose being given half an hour apart. To avoid nausea, vomiting, vertigo and dizziness, it is essential to inject very slowly. In the interval between the injections the patient is allowed to be up and around. About an hour before the second injection, 20 grains of sodium bicarbonate is given and an equal amount every three hours thereafter until the examination is complete.

Films should be made for control before administration of the dye. The first films are made four hours after injection. Films are again made at eight hours, thirty-two hours and, if the shadow is quite distinct at this time, again at forty-eight hours.

During the first day, the patient has no food in the morning, only a glass of milk at noon, and only salads, fruits or cereals at the evening meal. During the second day the diet is

likewise restricted to cereals, fruits and salads.

The technique for exposure is outlined by the author. The tube is tilted ten degrees toward the head of the table. A very fine focus radiator tube is used with 10 milliampere current and with a penetration corresponding to a spark gap of three and one-half to five inches. It is desirable on the preliminary series to have five or six films made with a slightly varying penetration, so a four and one-half or five inch gap is started with and decrease the penetration slightly on each successive film, increasing the time of exposure to make up for the softer rays. The series of films should cover the region from the tenth rib to the iliac crest on the right side, and should show the distinct lower border of the liver, the lower ribs, the right half of the lumbar spine and the right kidney.

The findings and the normal performance of the gallbladder appears to be as follows: "The normal gallbladder shadow should begin to show distinctly at four or eight hours, it should reach a maximum at twenty-four hours or perhaps before, and should probably be getting less dense at thirty-two hours. The outline should be regular, that is, there should be nothing ragged or uneven about it. The organ should vary quite markedly in size through the series, getting smaller as it becomes more dense. Failure to follow this normal procedure would suggest interference with function, structure or both. In the first place, complete failure to visualize the gallbladder, if there is no evident reason for it, as very extreme thickness of the abdominal wall, would suggest occlusion of the cystic duct. Irregular, ragged outline, and failure of the gallbladder to change in size during the examination would suggest adhesions. Whether we are entitled to draw conclusions as to biliary stasis, lack of concentrating power and other purely functional peculiarities we do not yet know."

Production of Liver Necrosis: By Tetrachlorphenolphthalein and Tetrabromphenolphthalein. Reuben Ottenberg, M. D., and Harold A. Abramson, M. D., J. A. M. A., 84:800, March, 14, 1925.

THE tetrahalogenphenolphthaleins all have their place in medicine. The chlorin compound is being used in the liver function test, the bromin compound is used in visualizing the gallbladder for roentgen ray diagnosis, and the iodin compound has been in use for some years as a local antiseptic. Few observers have noted toxic effects from the use of these compounds.

Experimentally, the authors varied the dosage of the chlorin and bromin compounds, which they found to produce practically identical results, in their administration to rabbits, and noted the results. Using 0.1 gm. per kilogram of body weight, no symptoms or lesions were noted. Administering 0.2 gm. per kilogram produced weakness, the presence of substances in the urine and minimal or absent lesions in the liver. With 0.3 to 0.4 gm. per kilogram the symptoms were very marked and there were definite lesions in the kidney and spleen. Doses of from 0.4 to 0.5 gm. per kilogram killed the rabbits at once or within fifteen minutes, with acute symptoms and extensive degeneration of the liver cells.

"A peculiar feature was the lack of gradation between toxic and nontoxic doses.....The doses needed to produce severe symptoms and liver lesions were enormously larger than those used in the tetrachlorphenolphthalein test for liver function, while the amount of tetrabromphenolphthalein used for gallbladder visualization is also safely below the toxic dose, but the margin is not so large."

Cholecystography: The Use of Sodium Tetraiodophenolphthalein. Evarts A. Graham, M. D.; Warren H. Cole, M. D., and Glover H. Copher, M. D., J. A. M. A., 84:1175-1177, April 18, 1925.

IN their various experimentations, the authors have determined that the dose of their new dye, tetraiodophenolphthalein and the tetrabromphenolphthalein, 0.2 gm. per kilogram of body weight, does not produce lesions in the liver or other parenchymatous organs.

The technique advised by them for its administration is practically the same as that advised for the tetrabrom dye. Sodium tetraiodophenolphthalein can be made into solutions as high as 40 or 50 per cent without difficulty. The authors have arbitrarily chosen a 12.5 per cent solution or 8 c.c. of water per gram for injection. Three and five-tenths grams of sodium tetraiodophenolphthalein, which is an adequate dose for the average adult, is dissolved in 28 c.c. of freshly distilled water and the solution filtered. It is then sterilized for fifteen minutes over a boiling water bath. Before sterilization the solution is put in ampoules, which have been kept as long as three weeks after preparation. The solution is given intravenously in two doses, one-half

hour apart, in the morning before breakfast, between 7:30 and 9 a. m. Avoid extravasation or sloughing may occur.

The interpretation of the roentgenograms is the same for the shadows produced by the sodium tetraiodophenolphthalein as for those produced by the sodium tetrabromphenolphthalein. According to the authors, Dr. Sherwood Moore has reported a correct diagnosis of gallbladder pathology by cholecystography in 92.5 per cent of 55 cases in which the diagnosis was confirmed by operation.

Oral Administration of Sodium Tetrabromphenolphthalein—Preliminary Report. Thomas O. Menees, M. D., and H. C. Robinson, A. B., M. D., Am. J. Roentgenol., 13:368-369, April, 1925.

SODIUM tetrabromphenolphthalein offers such great possibilities in the diagnosis of gallbladder disease that it should be made as simple and as nonirritating as possible to the patient. Its intravenous use is handicapped by occasional severe reactions and the possibility of necrosis at the site of injection.

It has been found by the writer that sodium tetrabromphenolphthalein is absorbed when administered by mouth, and can be safely given in amounts sufficient to outline the gallbladder.

The oral method has the following advantages:

1. It gives the patient less discomfort.
2. There is no danger of sloughing.
3. It is less time consuming.
4. It is safer, as the dye does not reach as great a concentration in the systemic circulation, if it reaches the systemic circulation at all.

The chief disadvantage of the oral administration is that a certain number of patients will not be able to retain the dye. Another disadvantage is that a complete record of the filling and emptying of the gallbladder is not obtained.

Diagnosis will probably depend on the same factors as with the intravenous method.

RESPIRATORY SYSTEM

X Ray Study of the Accessory Sinuses, a Radiological Viewpoint. C. D. Enfield, M. D., Kentucky M. J., 23:253-254, April, 1925.

THE author is a practicing radiologist and fully appreciates the problems that present themselves to the radiologist. In considering the value to a rhinologist of the roentgen examination in offering the correct interpretation of the pathological condition that exists, too much is ordinarily expected. X ray pictures are graphic representations of different densities. These densities vary with the proportion between bony content and air content and the possible secretory material intervening. And before reaching a conclusion as to a pathological change existing, the conclusion as to the normal sinus picture must be individually settled. "This normal sinus picture depends upon equal and symmetrical bony development, and upon equal and symmetrical air content, so that the paired cavities may be compared one with the other. There may be a lack of symmetry in either air content or bony development, and consequently in density, without present or active disease, and I believe that exceptionally there may be symmetry in x ray density with present and active unilateral disease." So that at best, the determination from simply the x ray picture alone of the presence or absence of pathology is surely an unreliable conclusion. Granting that symmetry had previously existed between the paired cavities, and that pathological changes—as a rarefying osteitis compensating for a thickening of the lining—existed in the picture, it would be utterly impossible without the clinical picture and a thorough physical examination to determine whether or not these changes were not the result of a previous disease that had been cured but the resulting pathological changes naturally persisted. X ray pictures of sinuses should be used as an aid in the diagnosis and not serve as an unsupported basis for operative interference.

In regard to sinuses infections in children, the x ray is very important in determining the extent of development of the sinuses. In adults this same important determination of the development of particularly the frontal sinuses is necessary, since they are subject to such wide and common anatomical variations. Information obtainable as to the extent and distribution of the cells constituting a cavity is a valuable preoperative aid. Postoperatively, the x ray picture will aid in determining the progressiveness of the treatment.

The Treatment of Asthma by the Removal of its Pathology. B. Frank Walters, M. D., J. Michigan State M. S., 24:145-148, March, 1925.

THE author quotes the work of many of the most prominent of western diagnosticians

in thoracic conditions and decides that the treatment indicated in asthma is roentgen ray or some form of physiotherapy. "We cannot invoke the aid of surgery for the asthmatic thorax, but we have in the proper application of the x ray, diathermia, the mercury-quartz lamp and older form of electrotherapy, a kind of supersurgery, a finer and more delicate scalpel, which insinuates its way into the vital tissues and, without any destruction thereof, stimulates the removal of those elements deposited or formed which produce the status asthmaticus; and no longer need it be said: 'Once an asthmatic, always an asthmatic.'"

The Value of Endoscopy to the Internist. Bernard J. McMahon, M. D., Missouri State M. J., 22:1-6, January, 1925.

ENDOSCOPY may be of distinct value to the internist for the following reasons:

1. It confirms and renders more accurate his diagnosis of certain conditions of the respiratory and esophagogastric tracts.

2. It serves to gauge the progress of his general treatment by its effects upon conditions in these tracts.

3. It enables the therapeutist to treat local lesions and strictures directly by the guidance of the skilled eye as well as the hand, as contrasted with blind methods only.

4. It aids in removing foreign bodies from the respiratory and esophagogastic tracts.

Roentgenograms as Evidence. Editorial J. A. M. A., 84:1071-1072, April 4, 1925.

THE medicolegal position of the roentgenologist has been so variously interpreted that a repetition of the above article in its entirety is indicated.

"A roentgenogram is not admissible in court as evidence until after it has been authenticated. It must first be shown by one or more competent witnesses what the roentgenogram is and that it pictures accurately what it purports to show. For this purpose a witness may testify (1) that the roentgenogram shows accurately what he saw when he looked through the fluoroscope into the body portrayed, or he may show (2) that he is skilled in the use of the roentgen ray machine and in taking and developing roentgenograms, that he took the roentgenogram offered in evidence, or saw it taken, with the body in the stated position, with a machine he knew to be accurate and in good working order, and that from his experience he knows that the roentgenogram accurately represents the internal condition of the body roentgenographed. These two methods of authentication are, however, not exclusive; any other satisfactory evidence that establishes the authenticity and accuracy of a roentgenogram will establish its admissibility—Stevens vs. Ill. Cent. R., 137 N. E. 859, J. A. M. A. 81: July, 1923.

"A witness undertaking to establish the authenticity of a roentgenogram must be able to state how he identifies it. Unless it has been in his custody ever since it was taken, he may be made an innocent party to fraudulent substitution, or a substitute roentgenogram may be submitted to test the accuracy of his identification of the one said by him to be authentic. Accidental substitution, however, through carelessness in marking and filing is more likely, and this may happen even though the roentgenogram comes from his own files.

"E. F. Blaine, in the American Journal of Roentgenology 10: April, 1923, described a method of marking by lead stencils cut for each case and roentgenographed at the time of the exposure. He regards this as superior to the use of movable opaque letters and figures. When it can be shown that a roentgenogram comes from proper custody and is identified by marks made either by stencil or by movable letters and figures, its authenticity may be regarded as sufficiently established. The fact remains, however, that if one roentgenologist can use a stencil machine or movable letters and figures for the identification of roentgenograms produced by him, another roentgenologist may use a similar machine or similar figures to make similar markings with fraudulent design or for the sole purpose of confusing and discrediting the witness.

"To guard against the possibility of deliberate substitution of roentgenograms and to provide a convenient and economical method of identifying them, the method recommended by R. B. Taft, in American Journal of Roentgenology, 12: October, 1924, seems better. By this method the marks can be made to appear in the handwriting of one or more persons, and the chance of trickery or mistake is reduced more nearly to the chance of forgery of handwriting. Taft experimented unsuccessfully with such solutions as sodium bromide, silver nitrate and mercuric chloride. Heavy insoluble substances, such as barium sulphate, mercuric iodide and lead oxide, suspended in mucilage would not flow from a pen, and even when painted on with a brush gave unsatis-

factory results. Crayons, in which such substances were incorporated, were too friable for practical use. He reports that he obtained satisfactory results, however, by using as a writing fluid a mixture of about 25 per cent of standard mucilage of acacia added to ordinary ink, used in conjunction with powdered metallic lead. By means of a heavy stub pen, the mucilage-ink mixture is used for writing the identifying marks on slips of paper. Before the mixture has had time to dry, the writing is sprinkled with powdered metallic lead. The excess is shaken off and a thick ribbon of lead is left enmeshed in the mucilage-ink mixture, thus outlining in lead what has been written. The slip of paper thus marked is placed alongside the part that is to be roentgenographed, and the exposure is made in the usual way. The lead-writing appears on the roentgenogram.

"Dr. William J. Manning of Washington, D. C., has suggested the practicability of using fingerprints for the identification of roentgenograms. Experimentally a fingerprint was made on a film holder, a mixture of white lead in oil and barium sulphate being used. When the film was developed, the fingerprint showed on it with sufficient clearness to permit its being easily identified with the fingerprint on the film holder.

"In any medicolegal case the roentgenologist must guard against being made the victim of impersonation of the alleged injured party by some one substituting for him. In any case known to have medicolegal bearings, the roentgenologist will do well to make sure that the person whom he is about to roentgenograph is the person he represents himself to be. He should be prepared, so far as may be possible, to identify in court the person roentgenographed as the same person whose condition the roentgenogram portrays. Such personal identification may be difficult for the busy roentgenologist, who may see the patient but once for a short time only. Obviously, the method proposed by Taft can be made to aid in such personal identification, for a specimen of the handwriting of the person roentgenographed can be made to appear on the roentgenogram. If that method is not followed, the roentgenologist can facilitate subsequent proof of the identity of the person roentgenographed by having him affix his signature to the office record of the case at the time the roentgenogram is taken. Either this can be done as a matter of routine in medicolegal cases, or some plausible reason can be found for asking for such a signature in those cases in which the roentgenologist desires to preserve a record.

"To reduce to a possibly irreducible minimum the chances for substitution, it might be well to have each roentgenogram identified not only by the signature or fingerprint of the roentgenologist, but also by signature or fingerprint of the person who is to be roentgenographed. The presence of marks identifying the roentgenogram with both parties would not only facilitate identification of the roentgenogram itself, but would make more difficult impersonation of the plaintiff at the outset of the case or subsequent substitution of a fraudulent roentgenogram. Identification will always be greatly facilitated and strengthened when it can be established that the roentgenogram offered in evidence has been constantly in the proper custody since it was taken; and this means under lock and key.

"The roentgenologist who, from the very beginning, prepares to meet all possible demands that may be made to establish the admissability as evidence of the roentgenogram he produces will do much to save the court, council and himself all unnecessary difficulty and annoyance later. It is too late after the trial is under way to go back and make good any shortcomings that occurred in the beginning."

OSSEOUS SYSTEM

The Nomenclature Used by the Registry of Bone Sarcoma. E. A. Codman, M. D., Am. J. Roentgenol., 13:105-126, February, 1925.

THE subject of a recognized and universalized nomenclature has been the constant bugbear of the medical profession. The formation of the Registry four years ago was an important step in the right direction. Dr. Codman, Registrar of the Committee of American College of Surgeons, on Bone Sarcoma, together with Drs. Ewing and Bloodgood, joined with a committee appointed by the Clinical Pathological Association comprised of Drs. MacCarty, Sondern, St. George and Bell, to adopt the following nomenclature and classification, which is hereby presented to the teachers of surgery, roentgenology and pathology with the request to use it or to differ publicly:

1. *Metastatic Tumors.* These tumors are usually true to the primary type, to some degree, and are seldom, if ever, purely differentiated tumors in bone. Roentgenologically, they are usually central.

2. *Periosteal Fibrosarcoma.* The origin of these tumors is not definitely known. They lie next to the bone, do not invade the bone, although they may cause absorption by pressure on the adjacent surface of the bone, show no tendency to form osteoid tissue, cartilage or bone, and are not distinguishable histologically from fibrosarcomas of the fascia.

3. *Osteogenic Tumors.* These tumors are believed to be derived from cells which are supposed to be the embryonal cells concerned with the formation of bone, cartilage and the fibrous network of bone. This class may be subdivided again into the benign and malignant types. Of the malignant types, *osteogenic sarcoma,* the commonest type of subordinate clinical entities, is of both medullary and subperiosteal, showing central bone destruction and subperiosteal bone proliferation. Roentgenologically, these tumors are more frequently seen near the ends of the bone than in the shaft. They may show a considerable amount of bone destruction, or may simply destroy bone and, therefore, show erosion and invasion in the x ray plate. The amount of bone production in osteogenic sarcomas varies considerably, taking place through the greater part of the tumor, they are called *sclerosing,* or if they are rather vascular they may be referred to as *telangiectatic. Undifferentiated sarcomas* are included under the Osteogenic Sarcomas, inasmuch as such tumors are presumed to have their origin in cells which were destined to produce bone.

4. *Inflammatory conditions* included such forms of osteitis as Pagent's disease, Von Recklinghausen's disease and the various forms of single and diffuse cystic disease of bone which have not yet received a definite pathologic standing. Bone cysts are included under this heading.

5. *Benign Giant Cell Tumor* is a term accepted to replace the term giant cell sarcoma, since many surgeons and pathologists have been accustomed to regard this type as more or less malignant, while up to date the Registry has found no instance of a clear case of one of these tumors causing metastasis. Roentgenologically, they are central tumors expanding the bone locally.

6. *Angioma* constitute the sixth class, which is subdivided into the benign and malignant types. The benign angioma, roentgenologically, rarefy bone and expand it, in something the same way as giant cell tumors, but have more and smaller loculi.

7. *Ewing's Tumor* generally involves the shaft of the long bones, producing a widening of the shaft, apparently by spreading apart the lamellae of the bone. This tumor is more apt to be multiple and is to be found more often in the skull and short bones. Roentgenologically, it shows a characteristic longitudinal striation and the tumor nearly always involves more than half of the shaft.

8. *Myeloata* are usually multiple, central tumors, not bone producing, which roentgenologically show no bone proliferation and are usually clearly defined. At times they show the invasion of the bone in a moth-eaten way, resembling the characteristic picture of cancer. For clinical and roentgenological purposes the committee considered it unnecessary to subdivide the myelomas.

"For all intents and purposes the person who presents himself with a bone tumor which is not inflammatory or metastatic may be told he has one of five tumors—periosteal fibrosarcoma, prognosis fair with complete excision; benign osteogenic tumor, prognosis excellent with radical excision; osteogenic sarcoma, prognosis bad no matter what its treatment, although a few recoveries following amputation are on record; benign giant cell tumor, prognosis good under almost any treatment except bad surgery; Ewing's tumor, prognosis good for immediate reduction under roentgen radiation, but eventually bad; myeloma certainly and slowly bad but probably retarded by radiation.....All these colorful adjectives (such as fibro, chondro, osteo, round, spindle, etc.) are like the colors of our neckties, which make very little difference to anyone except to ourselves, but are sometimes useful to describe a man if you do not know who he is."

The Diagnosis of Diseases and Injuries of the Knee. Richard Stephens, M. D., Long Island M. J., 19:183-187, May, 1925.

X RAY is a most important adjunct in establishing a diagnosis of disease and injuries to the knee. A knowledge of the normal contour of the knee, showing the relationship of the femur, tibia, fibula and patella, is essential.

In chronic arthritis the roentgen ray film shows atropic or hypertrophic bone changes, while in synovitis a negative picture results.

The x ray is of very great value in making a diagnosis of tuberculosis and in recording the progress of the infection. The appearance

is that of a destructive lesion showing a thinning of the bone, with very rarely some proliferation except in late stages where healing is taking place.

In syphilitic lesions of the knee there are two possibilities. In the chronic arthritis or congenital syphilis, productive changes are more often seen than destructive changes. In the second type, or Charcot Joint, there is a marked enlargement of the joint, as shown by the x ray.

Ankylosis is a frequent result of a long standing gonorrheal arthritis.

In intra-articular trauma, the x ray is of value in early cases if it shows a narrowing of the joint space, although if it is negative it does not rule out the diagnosis. If the cartilage is coiled upon itself it may be dense enough to cast a shadow or if the injury is an old one there may be some calcifications which would then be seen.

Injuries to the crucial ligaments are usually not demonstrable by the x ray, but fractures of the spine of the tibia or its tubercles may be revealed by the x ray.

Lesions of the Tibial Tubercle (Osgood-Schlatter's Disease). Maurice M. Pomeranz, M. D., Am. J. Surgery, 39:17-23, February, 1925.

THE avulsion of the pretibial tubercle occurs most frequently in the adolescent. The disease is more common than generally supposed. Due to the absence of acute symptoms the diagnosis is seldom made unless a roentgenological study is made. The principal diseases from which it is to be diagnosed are osteomyelitis, lues, tuberculosis of the knee or sarcoma. Roentgenogram of the knee shows the apophysis incompletely united to the shaft or a definite separation can be noted. The degree of the force applied determines the extent of the damage to the bony parts.

Fractures. Editorial J. Michigan State M. S., 24:332, June, 1925.

As the general practitioner advances more and more into the fields of specialization, the careful details of general cases are neglected. Fractures are still the same "break of a bone" and present the same four physical diagnostic signs. But in the care of these frequent conditions the routine practiced by our predecessors should not be disregarded. With the advent of the laboratory, this routine should be increased rather than decreased and much better results will be obtained. Consequently the author is "constrained to once more impart the following points:

"1. In every injury, make a careful examination.

"2. Use the x ray and corroborate the presence or absence of a fracture.

"3. If a fracture exists, obtain a complete reduction.

"4. A general anesthetic is required to obtain complete reduction.

"5. Immobilize with proper splints.

"6. Examine frequently to assure continued reduction.

"7. Institute early passive motion and muscle massage to prevent ankylosis and contractural deformities.

"8. See the person frequently and fortify yourself with consultants in the more serious fractures.

"9. Take and explain the injury and attending difficulties to your patient.

"10. Have several x rays made during the course of treatment and discharge for your record and protection.

"Your services, characterized by attention to these details, will accomplish better end results."

The Treatment of Bone and Joint Tuberculosis. Lawson Thornton, M. D., J. Med. Assn. Georgia, 14:89-91, March, 1925.

THERE are certain points that must be followed in the successful treatment of bone and joint tuberculosis:

1. Early recognition and immediate treatment are essential for prevention of massive destructive and deformities in bone and joint tuberculosis.

2. Immobilization is absolutely necessary for healing in bone and joint tuberculosis.

3. Fusion of tuberculous joints insures permanent healing of the disease.

4. Spine fusion operation should be done in almost every case of tuberculosis of the spine, together with pre- and post-operative heliotherapy.

5. In tuberculous hips and knees, x ray pictures in the early stages do not always reveal the nature of the disease. They should always be fused in a position to give the optimum functional results.

6. Hospitalization for many months facilitates the treatment of the disease.

7. Heliotherapy and general hygienic treatment are essential. Heliotherapy is undoubt-

edly of wonderful therapeutic value in bone tuberculosis. The skin develops an unlimited tolerance for the sun's rays when the time of exposure is gradually lengthened. Heliotherapy plays an important part in healing tuberculosis of the bone.

A "Forme Fruste" of Chondrodystrophia, With Changes Simulating Several of the Known "Local Malacias." NILS SILFVERSKIOLD, M. D., Acta Radiol., 14:44-57, March, 1925.

THE writer describes a peculiar case of chrondrodystrophia, in which the forearms and hands are in all essentials of normal development. Besides, this case presents, to a greater extent than any other case hitherto published, roentgenologic changes which in many respects remind of the roentgenologic findings in Legg-Calve-Perthes-Waldenstrom's disease of the hip, Kohler's disease of the scaphoid and the other so-called local malacias.

Roentgen Ray Treatment of Tumors of the Brain. E. B. TOWNE, M. D., J. A. M. A. 84:1812-1815, June 13, 1925.

IN the treatment of tumors of the brain, accurate localization is the first requisite. Exploration should be done to rule out benign tumor or to verify, if possible, glioma. Decompression will determine whether or not there is intracranial tension and may be used to determine the degree of same. With these requirements satisfied, postoperative treatment should be used persistently, even when the glioma is cystic.

The author can offer no way of predicting whether the roentgen ray will have a favorable effect on the tumor or not. As some gliomas do well with compression alone, good results can be attributed to the roentgen ray only by continuing the treatment and demonstrating the beneficial effect of further treatment if there is a relapse. This treatment has been used on ten patients by the author. Four times it had no effect; four times it could not be proved to have been responsible for the clinical improvement; and twice it had a clearly favorable influence.

The Old Age Problem. W. B. DICKINS, M. D., New Orleans M. & S. J., 77:415-419, April, 1925.

OLD AGE, according to the author, is that period of life in which the degenerative changes, that set in after maturity, become apparent. This does not correspond to any definite term of years, but is hastened by want, confinement, hardships, mental anxiety, exposure, bad habits, accidents and disease. Rejuvenation has very many advocates, each proclaiming their own method whether it be physical, surgical, organotherapy, drugs, ultra violet ray, heliotherapy, x ray, radium and mud baths. Each one is as efficacious as the other —the duty of this reference being to inform the readers that physical therapy has been included in unethical discussion.

RESEARCH

Effects of Radiations of Cod Liver Oil. I. A. MANVILLE, M. D., J. A. M. A., 84:1401-1403, May 9, 1925.

RICKETS are known to be curable by cod liver oil, egg yolk and other naturally occurring foodstuffs. Radiations from ultra violet light bring about the same result. For this reason any of the experiments carried on and proved for cod liver oil are also applicable to ultra violet radiation. In 1923 Park, Powers and Guy made the statement that the similarity between the action of cod liver oil and that of radiant energy in rickets is so close that a connection must exist between them. The author presents some further interesting information.

"Besides the action of cod liver oil in curing or preventing rickets, we are led to conclude from the foregoing that there are two other specific actions: (a) There is a stimulation of cell activity and a distinct inhibitory effect on bacterial growth; (b) when these active principles are in excess of the amount producing stimulation, there is exerted a depressing action, the most striking manifestation of which is a lack of fertility. The separation of fat soluble A into two separate vitamins each with a specific action does not seem justified when the effects can be explained as being due to different concentrations of the same principle."

Notes on X Ray Protection. PHILLIS K. BOWES, M. A., B. Sc., M. S. R., Brit. J. Radiol., 30: 90-95, March, 1925.

IT is the advice of the author to have some covering over the lead used for the protective boxes—a thin sheet of paper being quite suitable. Very often protective screens are to be seen which have one side of polished wood and the back, which is towards the operator, is lead covered. The screen would be safer for

the operator if turned around the other way. To make such a screen safer and yet not unsightly, the lead side can be kept towards the operator, but should be covered with paper or some other suitable material. The results also show that the protection of lead rubber gloves is greatest if the linings are kept absolutely clean.

On Measuring and Expressing X Ray Quality in Radiotherapy. B. E. Luboshez, M. Sc. Brit. J. Radiol., 30:81-90, March, 1925.

BEFORE one can obtain uniform results in radiography, it is necessary to understand the conditions under which one is working. The quality and quantity of radiation are necessary essentials in the successful administration of any radiographic measure. The author considers here only the question of quality. By the application of principles of physics and mathematical calculation, the author arrives at a table designed for the determination of this quality factor, and which he hopes will be of practical use and prove sufficiently accurate to those practicing radiography.

Investigation Into the Biological Effect of Filtered and Unfiltered X Rays, as Measured on Peas. Leif Arntzen and Carl Krebs, Acta Radiol., 4:5-31, March, 1925.

THE experiments were performed on Victoria peas. As a measure of the biological effect of the x rays the authors used a radicle, which has a straight perpendicular growth and which is easy to measure by means of a piece on millemeter paper.

An absolute, stimulatory effect has been proved to result from doses of about 1/42 S-N. The stimulation could be demonstrated for the first, and in some instances for the second period of twenty-four hours after exposure, but after that time it ceased.

A single, full exposure produced a stronger biological effect than the same dosage administered in a series of divided doses.

The full effect of large inhibitory doses does not make itself felt until several days after the exposure.

When the Sabouraud Noire Pastille was used to check the exposures, the biological effect of the x rays filtered through 5 mm. of aluminum was only half as great as the effect of either the unfiltered rays or the rays filtered through ½ mm. of copper plus 1 mm. of aluminum. This is due to the pastille's discontinuity of absorption.

The biological effect, as measured on the radicles of the peas during the three to twenty-four hours after radiation, is in proportion to the ionization effect independently of the filtration.

Einige Untersuchungen Uber Vorrichtungen Zum Schutz Gegen Rontgenstrahlen. Rolf M. Sievert. Acta Radiol., 14:61-75, March, 1925.

THE radiation penetrating the protective arrangements against roentgen rays has been examined by means of an ionization instrument. The results of observation have been perspicuously transferred to plane of the roentgen departments, where the measurements have been done. These show that the secondary radiation from the walls, floor and ceiling have hitherto been generally underrated. Some protective arrangements against these rays are suggested by the author.

Report of Committee on Standardization of Physical Therapeutic Measures. J. Willard Travell, M. D., Am. J. Electroth & Radiol., 43:93-95, March, 1925.

WE are in sympathy with the efforts put forth by the American Electrotherapeutic Association for the cooperative advancement of the field of physiotherapy and the publication of these reports in the above journal. To aid in a rather meager manner, the Journal will abstract these reports and urge their careful consideration by our readers.

In the above report, attention was centered upon a few selected diseases and a method of procedure in their treatment was advised:

1. *Pneumonia.* Diathermy is to be applied through the chest antero-posteriorly or from side to side, using plates 10 inches by 10 or 12 inches by 12, daily or perhaps two or three times a day. The first treatment should be mild, 1,000 ma. for twenty minutes. Then, if the general reaction from destruction of bacteria and liberation of toxins is not disturbing, later treatments should be of 1,200 to 1,500 ma. for thirty minutes each. Heavy dosage is to be avoided, and it is well to avoid large amounts through the heart. Diathermy should be followed by white light of the hot oven for fifteen to thirty minutes.

2. *Pleurisy, with or without effusion.* Use the same technique.

3. *Frontal sinusitis.* Using a frontal electrode, 2 by 2½ inches, with a larger suboccip-

ital electrode, diathermy should be applied not exceeding 500 ma. for twenty minutes. Follow this with radiant light to the forehead and face for twenty minutes.

4. *Hypertrophied turbinates.* The flat vacuum electrodes, with the static current, negative polarity, ¼ inch spark gap, current within toleration, should be applied for ten minutes three times a week. Ultra violet light from a water cooled lamp should be used from fifteen seconds up to five minutes on each side three times a week.

5. *Hay fever and rose fever.* A very high frequency alternating current should be applied with nonvacuum tube in the nares for ten minutes on each side daily for three times a week, followed by the ultra violet lamp.

6. *Lymphoid hyperplasia.* When occurring in the posterior nares and pharynx, roentgen ray should be given for five minutes at 4 ma. with 7 inch spark gap at a distance of 10 inches, filtered through 3 mm. aluminum and 4 thicknesses chamois. Each side of the throat should be treated at each sitting and should be repeated every five days for three treatments. After a rest of two weeks or more, the treatments may be repeated.

7. *Herpes Zoster.* Diathermy should be used for one-half hour, using not more than 100 ma. per square inch of electrode. This should be applied over the spinal roots of the affected nerves and should be followed by ultra violet light to the stage of hyperemia. Repeat the procedure in a day or two. If cicatricial tissue is present in a posteruptive neuritis of herpes, use the x ray in small repeated dosage, as 2 ma., 7 to 8 inch spark gap, 3 mm. aluminum filter, 10 inch distance, for five minutes three times a week.

Direct Measurement of the Gamma Radiation Received by the Tissues. Dr. Lucien Mallet, Brit. J. Radiol., 30:155-173, May, 1925.

THE sensitive portion of the cell is the chromatin of the nucleus, and this portion is particularly fragile at the moment of nuclear division. It seems logical, therefore, in the mind of the author to assume that constant radiation over a prolonged space of time will have different cancericidal effects from the noncontinuous radiation produced by the x rays of the most penetrating character. With the relation borne by cells in division to cells in repose once established, there is a logical method at hand for fixing the duration of the applications.

Such is the basis for the Curie therapy. After a careful review of the progressive changes that have led to the advance of this mode of therapy, the writer describes in detail the latest addition to their mode of therapy—the ionomicrometer, a microelectroscope.

"From the practical point of view, before making an application of radium (here we have surface apparatus particularly in view), we shall determine:

"1. The depth and extent of the tumor, and its immediate ramifications; and

"2. The duration of the application—this last condition depending upon histological examination, kariokinetic index and clineal factors. (The karokinetic index here referred to is the relation of the cells in division to the cells in repose.)

"If our purpose is to give the deeper portion of the region under treatment 50 per cent of the epidermicide dose, according to the depth and extent of the lesion, we shall proceed to set up an apparatus for application of the radium by referring to the diagrams and dosimetric tables. We shall then proceed to direct measurements by the ionomicrometer in order to check these basic indications. The power of the sources will be such as to give, say, to epidermatitis dose within the time fixed for the application.

"Suppose, now, that we have a fairly superficial tumour, situated 2.5 cm. below the cutaneous plane; we wish to apply some 50 per cent of the surface dose. We select the schematic arrangement and the curve which gives this proportion. It will consist of two rows of five tubes (1 cm. in length) on a curved support made of wax (10 mm. with radius 5.5 cm.). Suppose we wish to make an application for fourteen days, what amount of radium shall we require? We know the energy equivalent for this type of apparatus in weight of radium received by the skin at a certain point on the median axis—in the proposed conditions, for instance, t will be 6 mgr. 2 Ra.e. (the tubes being 10 in number and each one .62 mgr.).

"A simple arithmetical calculation in proportion will give the amount of radium required for the erythema dose in the specified time:

"6 mgr. 2 for 14 days (436 hours) = 20.85 units.

"The amount corresponding to 17 D units for the sametime is:

$$X = \frac{20 \times 17}{20.85} = 16 \text{ mgr. Ra. e.}$$

"If we wish to obtain the same effect in a week, multiply by 2—that is, 32 mgr. Ra. e."

Comparison of Different Metallic Filters Used in Radium Therapy. EDITH H. QUIMBY, M. A., Am. J. Roentgenol., 13:330-342, April, 1925.

THERE are many different filters used at the present time in radium therapy. The primary filter for deep therapy is always a metal, whether it be lead, gold, platinum, silver, brass or any other with a fairly high density. The type of filter used varies a great deal with the individual operator, who must adjust his exposure to the patient treated and his filters to the machine. The object of this paper is to set forth a number of relationships that have been found between certain physiological biological measurements and to supply data for the comparison of a few of the most used metallic filters.

After the absorption of the beta and gamma radiations in several of the metals has been determined, then the absorption in tissue or tissue substitute of beta and gamma radiation transmitted by a wide range of thicknesses of these metals has been measured. This information has been correlated with biological data obtained from numerous skin tests, using the threshold erythema as an indicator. From this an empirical relation has been worked out between ionization measurements and skin doses for radiation delivered by filters of various metals. It is the opinion of the author that this relation, being empirical, any calculations made within the range covered by the experiments will give sufficiently accurate results for practical work. This relation also gives a method for determining the erythema dose for any filter, based on the results of physical experiments. The data given enable the radiologist to figure out doses for many filters—different materials and different thicknesses. With the aid of data published, the determination of millicurie-hour doses can be extended to include applications of various sizes and shapes, as well as different distances from the skin.

Comparisons may be made of the quantity and quality of radiation effective at the skin, delivered by different applicators. A number of examples given in the article illustrate these points.

Using the threshold erythema as a standard —of radiation from the ordinary glass tube of radium emanation 14 mm. long, at a distance of 2 cm. from the skin—a table has been worked out in millicurie-hours for many filters.

A Physical Comparison of the Efficiency of Roentgen Rays for the Therapeutic Purposes Produced by Domestic Transformers and German Inductors. J. THOMPSON STEVENS, M. D., Am. J. Electroth. & Radiol., 42:448-450, December, 1924.

IN this article three types of roentgen ray machines have been compared by means of ionization chamber measurements at voltages of 140,000—two, one a transformed and one an induction coil, at voltages of 200,000.

These measurements prove that, under similar conditions, with the voltage which one thinks he is using actually getting to the tube, providing each instrument is delivering a properly rectified current, the radiation coming from that tube has the same value in the three types of machines measured.

Relation Between Physiological Dominance and the Biological Effects of Rays. W. T. BOVIE, Ph. D., Am. J. Roentgenol., 13:307-320, April, 1925.

IT is a commonly accepted fact that cancer tissues possess a high metabolic rate and are more susceptible to the effects of the rays. For this reason the author has undertaken investigation of the relation between the physiological dominance and the biological effects of the rays. Using as the initial preface that cancerous tissue is abnormal tissue which has escaped from the control of the rest of the organism, the author considers the relation of the cancerous tissue to the organism as comparable to that of a parasite to its host.

In the experimentation carried on, the amœba has been used. It was demonstrated by use of the amœba that the ultra violet energy changed to atoms and molecules of the protoplasm into a more chemically active condition, so that the chemical reactions occurred at destructive velocities. The end result demonstrated was that the portions of the protoplasm which were immiscible before the exposure to the rays became miscible so that they flowed together and the interfaces were lost.

For the different kinds of protoplasm there are different chemical compositions. Each kind of protoplasm has a definite organization, which may be compared to the organization of atoms or molecules in a crystal. In the opinion of the author, the molecular orienta-

tion at the interfaces is accompanied by an electrical organization and that these electrical organizations form the basis of the phenomena which is studied in nerve physiology—that is, the action currents of nerves and muscles.

"So far I have emphasized the organization of the protoplasm in the three dimensions of space, but I would like to call your attention to the fact that in this process of photosynthesis, if chemical reactions are not properly timed the process will be interfered with. Photosynthesis consists of a series of events which must occur in a definite order and which must bear a certain time relation to each other. All chemistry of physiological change has this element of time in it.....and.....the velocities of the various chemical changes must bear certain relations to each other....Events mark off the duration of time. Protoplasm is organized not only in the dimensions of space, but the processes of life are organized in the dimension of time. Therefore, I would like to present for your consideration another universal law of biological organization, namely, that living things are organized in four dimensions, having three axes in the dimensions of space and one axis in the dimension of time."

The process of cytolysis by ultra violet light is stated in a new set of terms. "When we expose the organism to light we change some of its atoms into a chemically active condition .....We destroy the organization along the time axis, and the organization along the three axes of space then automatically disappears.

"We could have produced exactly the same results had we destroyed the organization along one of the axes of space, for then the organization along the other two axes of space would have been destroyed, and concomitantly the organization along the time axis."

BOOKS RECEIVED

Concealed Tuberculosis, or the Tired Sickness. A clinical study upon the exhaustion type of hidden tuberculous infections. By *George Douglas Head,* B. S., M. D. Cloth. Pp. 137, with 14 individual case temperature charts. Philadelphia: P. Blakiston's Son & Co., 1925.

Roentgen Diagnosis and Therapy. A revision and enlargement of the author's Manual of X Ray Technic. By *Arthur C. Christie,* M. D., M. S., F. A. C. P., Professor of Roentgenology, George Washington University Medical College; Roentgenologist to the George Washington University Hospital; Colonel, Medical Officers' Reserve Corps, U. S. Army; formerly Captain, Medical Corps, U. S. Army, and Professor of Roentgenology and Operative Surgery, Army Medical School, Washington, D. C. Cloth. Pp. 320, with 180 plates and illustrations. Philadelphia: J. B. Lippincott Company, 1925.

Ergebnisse der Medizinischen Strahlenforschung. Rontgendiagnostik, Rontgen-, Radium- und Lichttherapie. Vol. I. Herausgegeben von *H. Holfelder,* Frankfurt a. M.; *H. Holthusen,* Hamburg; *O. Jungling,* Tubingen, and *H. Martius,* Bonn a. Rh. Paper. Pp. 748, with 3 photographic plates and 451 illustrations. Leipzig: Georg Thieme, 1925.

Differential Diagnosis of Internal Diseases. An authorized translation of the fourth German edition, with extensive additions, written by M. Matthes, M. D. Translated by *I. W. Held,* M. D., and *M. H. Gross,* M. D. New York City: Cloth. Price $12.00. Pp. 908, with 176 illustrations, some in colors. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street.

Local Anesthesia. A monograph on the technique of local anesthesia, aiming at its standardization, presenting its indications and warning the beginner of the difficulties likely to be encountered. By *Arthur E. Hertzler,* A. M., M. D., Ph. D., LL. D., F. A. C. S., Professor of Surgery in the University of Kansas; Surgeon to the Halstead Hospital, Halstead, Kansas; to St. Luke's Hospital & St. Mary's Hospital, Kansas, Missouri; and to the Providence Hospital, Kansas City, Kansas. Cloth. Price $5.50. Pp. 272, with 140 illustrations. St. Louis: C. V. Mosby Co., 1925.

Modern Methods of Treatment. A comprehensive statement of the best modern thought and practice upon the treatment of diseases included in the general specialty of internal medicine. By *Logan Clendening,* M. D., Assistant Professor of Medicine, Lecturer on Therapeutics, Medical Department of the University of Kansas; Attending Physician, Kansas City General Hospital; Physician to St. Luke's Hospital; Physician to St. Mary's Hospital, Kansas City, Missouri. Cloth. Price $9.00. Pp. 692, with 77 illustrations. St. Louis: C. V. Mosby Co., 1925.

BOOK REVIEWS

X Rays and X Ray Apparatus. An elementary course. By *John K. Robertson,* Associate Professor of Physics, Queen's University, Kingston, Canada. Cloth. Price $3.50. Pp. 228, with 24 tables and 112 illustrations. New York: Macmillan Company, 1924.

The original publication of this valuable text appeared in a series of articles entitled the *Physics of X Rays and X Ray Apparatus* during the year 192— in the *Journal of Ra-* during the year 1923 in the *Journal of Radiology.*

The vacancy which this book fills has long been felt by members of the general profession. Its purpose is to present in a simple and comprehensible manner the physical principles utilized in the field of radiology. The average physician, with his limited knowledge of the physical laws, is hampered tremendously in attempting to understand the scientific and therapeutic papers presented by those versed in physics, who have specialized in the field of radiology. Heretofore, no means was so readily available for obtaining the foundation essential for an understanding of these physical principles, once it had been overlooked in the routine medical preparatory work. In the publication of this text, profiting by the years of experience in presenting in lecture form to medical students those principles underlying the use of x rays and other radiations, Dr. Robertson has rendered the profession a great service.

In the opening chapters of the text, the author explains the basic principles involved in the *interrupterless transformer*, after discussing the generation of induced currents, rectification of same, high tension, etc. The *induction coil*, a modified type of transformer, is considered and its principles utilized in referring to the Faradic current. Discussing the production of ions and electrons leads to the question as to the *origin of x rays*. This quite naturally brings the author to a careful consideration of the different types of x ray tubes. After discussing the principles under which the *gas bulb* is operated, the theory and radiation from the *Coolidge tube* is reviewed. The therapeutic applications of these fundamental physical properties receive the attention of the writer. After considering the *penetrating effect of x rays*, the *nature of x rays* and the *measurement of wave length*, the vital question of *secondary x rays*, which has been of great practical importance to every radiologist, is considered at length. The mathematical computation of *dosage* is reviewed in a readily comprehensible manner; and is immediately followed by a brief discussion of the principles and application of *deep therapy*.

Abundantly illustrated and containing many graphs pertaining to dosage, this book should appeal not only to the radiotherapist and general practitioner using radiotherapy, but to the radiologists in the various universities needing a sound text as a basis of instruction in the physics of radiotherapy.

X Ray Atlas of Normal and Abnormal Structures. By *Archibald McKendrick*, F. R. C. S., D. P. H., F. R. S. E., Surgeon-in-Charge of the Surgical X Ray Department, Royal Infirmary, Edinburgh Examiner, Royal College of Surgeons, Edinburgh, and *Charles R. Whittaker*, F. R. C. S., F. R. S. E., Assistant Lecturer on Anatomy, Surgeons' Hall, Edinburgh Examiner, Royal College of Surgeons, Edinburgh. Cloth. Price $10.00. Pp. 222, with 388 radiograms and 25 illustrative diagrams. New York: William Wood & Company, 1925.

In the preface the authors state the purpose of this *Atlas* as an attempt to provide a series of radiograms illustrating the normal and abnormal structures of the body, and the more common injuries and diseases.

The first portion of the *Atlas* includes numerous radiograms of the structure of the *normal joints of the limbs*. Different appearances of these normal structures are presented by altering the focus point. In the presentation of each normal joint, an accompanying diagram is used to illustrate graphically the anatomical landmarks, sufficiently labelled to render it easily understood. Each radiogram, by way of explanation, has the position of the joint under observation (whether extended, flexed, abducted, adducted, etc.), the view (whether antero-posterior, lateral, etc.) and the focus point given; and occasional remarks are made to facilitate the student in the realization of this normal outline.

This necessary realization of the contour and radiographs of the normal joints of the upper and lower extremities is immediately followed by as many radiographs of *injuries and diseases of the limbs*. The injuries of the limbs are all considered sequentially before the diseases are taken up. The same plan of presentation of the abnormal radiograms is used as in the consideration of the normal. A plan used in most similar texts is purposely omitted here—the arrows which are commonly used to point out the abnormalities are omitted so that the student may carefully search and attempt to interpret the radiogram without extraneous aid. In those radiograms where the interpretation is difficult, the authors have

provided key diagrams similar to those used in the normal considerations.

In a somewhat similar manner, radiograms of the *head, neck, thorax and spine* are reviewed. After illustrating the normal, the abnormal structures are shown. Explanatory notes are increased to aid the student's recognition of the abnormalities being demonstrated.

One of the most important sections of the text is considered near the end, radiograms of the *abdomen*. Here the material offered is naturally divided into two portions. After a detailed consideration of the normal variations within the gastro-intestinal tract, the abnormalities, particularly carcinoma, are illustrated. The genito-urinary tract is viewed with pyelograms, ureteral catheters in place and cystograms.

The *appendix* was added to offer to the student a few of the rare conditions that are occasionally seen by the radiologist.

The authors fully realize that this *Atlas* cannot in itself teach one to interpret radiograms. "Radiographic interpretation can only be satisfactorily learned from a careful study of actual negatives, and by assisting at screen examinations." However, a text to which one can refer when in doubt is essential. Just as a student in the dissecting room needs his anatomy, so does the student in the radiographic room need a guide. To the practitioner who desires a working knowledge on the interpretation of radiograms and to the student who has the opportunity to study screen examinations, this text should prove a valuable aid.

Practical Medicine Series, 1924. Vol. 1. *General Medicine.* Edited by *George H. Weaver, M. D., Lawrason Brown, M. D., Robert B. Preble, M. D., Bertram W. Sippy, M. D.,* and *Ralph C. Brown, M. D.* Under the general editorial charge of Charles L. Mix, A. M., M. D. Cloth. Price of this volume, $3.00, and of the eight volume series, $15.00. Pp. 736, with 32 plates and other illustrations. Chicago: Year Book Publishers.

The material presented in the above volume consists of abstracts of the current medical literature published during the year 1923 discussing the various medical problems and arranging these discussions chronologically by systems.

Infectious Diseases and Endocrinology, arranged by Weaver, comprises the first portion of the volume. Poliomyelitis and meningitis contain the most extensive abstracts and case reports, although the treatment of whooping cough is presented in its several phases, particular mention being made to the use of the x ray. The general subject of diphtheria is considered, while the diagnosis of smallpox and measles are stressed. In handling the subject of endocrinology, after a general discussion of the intricate balance existing between these various glands of internal secretion, particular stress is placed on the diseases of the thyroid.

Diseases of the Chest, handled by Brown, include all pathological conditions existing in the thorax except those referable to the heart. The latter is adequately discussed in the following section. In reviewing this subject the author arranges his material according to the natural anatomical divisions of the thorax. Of the diseases of the lungs, tuberculosis plays the leading role. The use of the x ray in establishing the diagnosis and the advocation of heliotherapy in the treatment of this disease are exhaustively considered. Lung abscess and pneumonia are reviewed chiefly from the diagnostic angle. Diseases of the bronchi and pleura, along with pneumothorax and diaphragmatic diseases, are also abundantly discussed.

Diseases of the Blood and Blood-Making Organs, along with *Diseases of the Blood-Vessels, Heart and Kidney,* form a most important section in this volume. After a consideration of the questions of blood coagulation and transfusion, particular mention is directed toward the two dyscrasias: leukemia and anemia. The relationship of the spleen and the bone marrow to the function of blood formation and cellular destruction is reviewed. In the discussion of the diseases of the heart and blood vessels, the author sets aside a portion of his time to the consideration of the relationship of the roentgen ray to the diagnosis of cardiac disorders. There is proportionate space in which each phase of cardiac pathology is discussed. Another portion of this section deals with diseases of the kidney, containing a number of valuable abstracts on nephritis.

Diseases of the Gastro-Intestinal System and Metabolism occupies a most important place in clinical medicine. In the organization of this volume the authors offer a superabundance of abstracts covering every phase of gastro-intestinal disorders. Particular emphasis is placed upon gastric ulcers, their diag-

nosis and treatment; insulin, its administration, and upon jaundice.

This volume gives one a concrete idea and an organized grouping of carefully abstracted subjects that occupy the attention of the medical men who contribute to the current medical literature.

Dental Drawing. A text whose aim is to develop the student's or practitioner's ability for drawing. By *Edward Drosen*, D. D. S., Head, Department of Dental Drawing, Marquette University. Card. Price $5.00. Pp. 83, with 22 full page plates and numerous other illustrations. Brooklyn: Dental Items of Interest Publishing Co., 1924.

In the preface of the text the author takes the stand that drawing is a language of form, a language which is simpler and more easily acquired than writing. Writing, he asserts, was at first the drawing of letters, and later the drawing from memory. Since drawing suggests the thing itself, while writing a word suggests a name or thought, it is evident that it is a much simpler process, calling primarily upon the faculty of imitation. From this realization of the evolution of modern script passed through by each individual, the author believes that every person who has been taught to write may, therefore, be taught to draw.

The object of this work is not to produce artists, but rather to teach dental anatomy by developing the reader's ability for drawing. This object has been demonstrated in the preparation of the 22 full page plates. In these not only the external outline of the teeth are shown, but sections, longitudinally and transversely, illustrate the arrangement of the internal structures—the relation of the enamel, dentin, cementum and the shapes and positions of the pulp canals.

After a short preliminary teaching of the fundamental principles of mechanical drawing, the author discusses and illustrates the art of shades and shadows. These necessary basic elements are then referred to the subject under consideration—dental drawing. An exhaustive discussion of the anatomy of the teeth—developmental, gross and microscopic—is abundantly illustrated by full page drawings. A chapter on the evolution of the face shows the development of the human face and the changes which it undergoes as old age approaches.

In the serious consideration of this work as a complete and ably handled text on dental drawing only one criticism may be offered. In its compilation one chapter should have been devoted to the preparation of dental drawings for publication. Many writers little realize the process through which a manuscript and its illustrations must pass before ready for publication; and the illustrations are so frequently essential for the full understanding of the article. In the arrangement of the second edition of this text, which is sure to receive the recommendation and mark of approval by the teachers of dentistry and the dental profession, we suggest this single addition.

Announcing the Fourth Annual

Physiotherapeutic Convention

ARRANGEMENTS have been perfected for a really elaborate Physiotherapeutic Convention to be held at the

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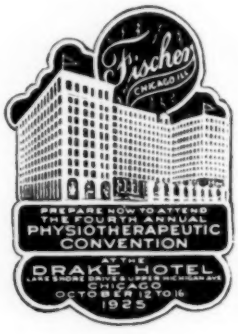
CHICAGO



October 12-16

1925

There will be lectures, clinics and demonstrations, all in charge of well-known physicians and surgeons. For purposes of demonstration, carefully prepared, papier-mache or wax figures and models will be used, and in some instances live models will be employed for this purpose.

The Convention will be subdivided into the following sections:

Eye, Ear, Nose and Throat.
Gynecology and Urology.
Orthopedics and Surgery.
Dermatology, including Malignancies.
Neurology.
Internal Medicine and Pediatrics.
Industrial Physiotherapy.
Miscellaneous Practise.
tice.

Special rooms will be provided on the mezzanine floor for smaller groups attending clinics and round table discussions, and for demonstrations to follow up interesting talks delivered from the platform. There will also be clinics at Chicago Hospitals.

Admission will be by card only. A. M. A. rules will apply throughout; either an A. M. A. fellowship card or its equivalent will ensure admission. Arrangements for accommodations, etc., will be attended to on request by the Educational Department of H. G. Fischer & Company.

A record attendance is anticipated. There were over seven hundred physicians and surgeons present at last year's Convention, and this year's record will be much higher. Those interested are advised to make plans now and

MAIL THIS COUPON

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Lincoln, Neb.
W. B. Chapman, M.D.
Carthage, Mo.
M. H. Cottle, M.D.
Chicago, Ill.
Elkin P. Cumberbatch, M.A., M.B., M.R.C.P.
London, England
Leo C. Donnelly, M.D.
Detroit, Mich.
Emile C. DuVal, M.D.
Chicago, Ill.
Raymond F. Elmer, M.D.
Chicago, Ill.
J. C. Elsom, M.D.
Madison, Wis.
F. H. Ewerhardt, M.D.
St. Louis, Mo.
George W. Funck, M.D.
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Salt Lake City, Utah
E. C. Henry, M.D.
Omaha, Neb.
A. R. Hollender, M.D.
Chicago, Ill.
Wm. E. Howell, M.D.
Chicago, Ill.
Arthur E. Joslyn, M.D.
Lynn, Mass.

Partial List of Speakers

D. Frank Knotts, M.D.
Chicago, Ill.
Disraeli W. Kobak, M.D.
Chicago, Ill.
Gustav Kolischer, M.D.
Chicago, Ill.
William A. Lurie, M.D.
New Orleans, La.
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Gentlemen:

Please send me the complete program, with reservation card, for the FOURTH ANNUAL PHYSIOTHERAPEUTIC CONVENTION, which I shall endeavor to attend.

Dr.....

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